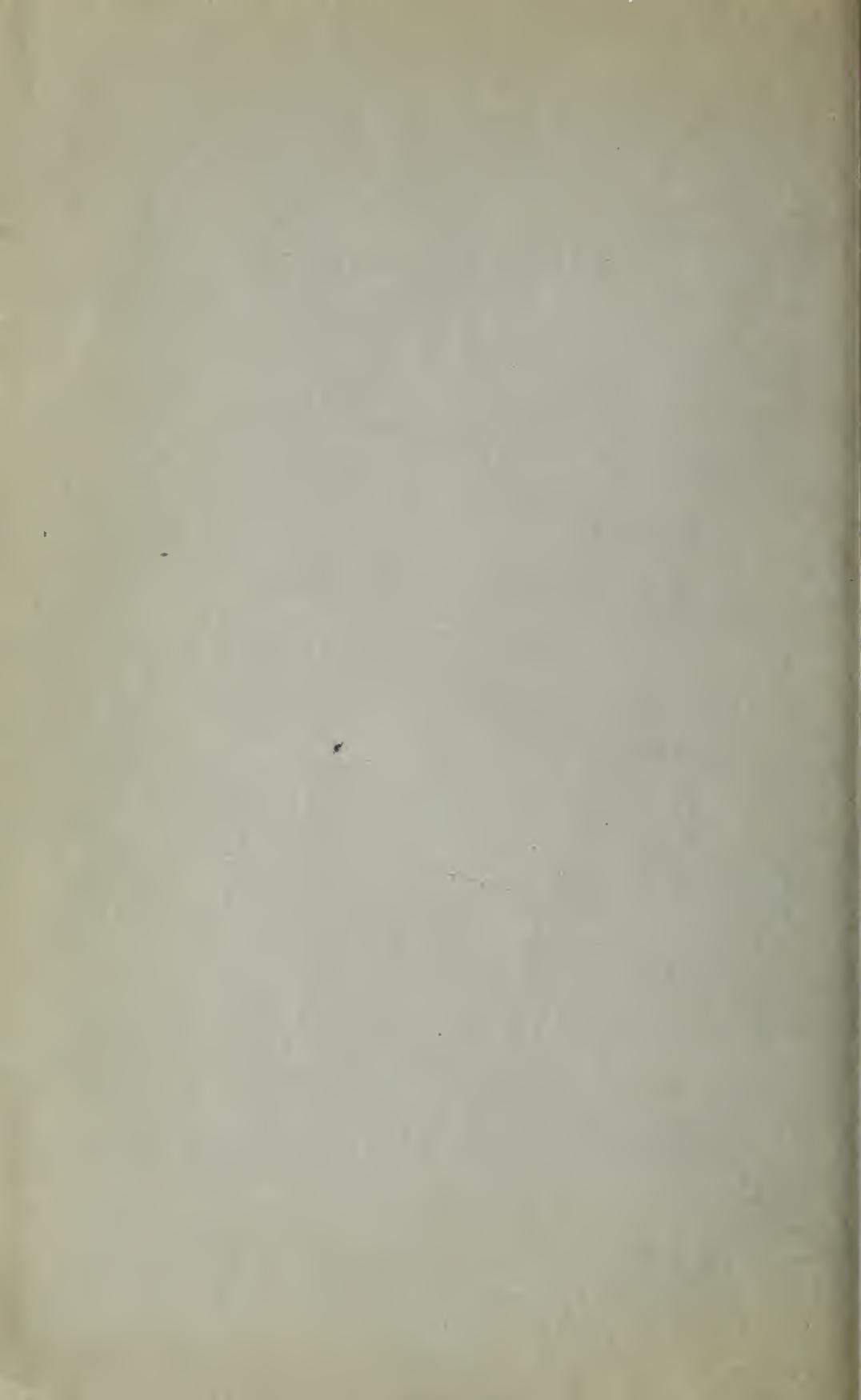


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High-Level Food Consumption in the United States



by

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CONTENTS

	Page		Page
Summary -----	2	The consumption-production	25
Food-consumption levels -----	4	balance -----	25
High-level defined -----	4	Food output in 1943 -----	26
Base-level consumption -----	7	Output and requirements -----	26
High-level consumption -----	14	Achieving high-level consumption -----	32
Total requirements compared -----	17	Problems of underconsumption -----	32
Income effects -----	22	Income approach -----	35
To the national economy -----	22	Educational approach -----	40
To agriculture -----	23	Service approach -----	42
		Recapitulation -----	45
		Literature cited -----	48

SUMMARY

1. The objective of this study is to define an attainable high-level food consumption for the United States and to estimate the quantities of food involved. The definition of high-level food consumption developed here takes into account two principal considerations: (1) What foods people need nutritionally to sustain good health and (2) what foods people would like to consume as indicated by consumption in the higher income brackets. In brief, the measure of high-level food consumption for each individual is simply the higher rate of consumption obtained in the comparison between the estimated actual consumption and the minimum nutritional requirement. The implications of achieving the high level of food consumption are then analyzed: (1) To determine the effect on American dietsaries, (2) to ascertain the income effects to the national economy and to agriculture, (3) to obtain a rough measure of the production adjustments involved. Finally, ways and means of achieving the high level of food consumption are reviewed and discussed.

2. But before the measure of high-level food consumption could be formulated a base or set of consumption patterns representative of food consumption, as of 1950, had to be derived. These patterns of consumption were estimated from historical data, in terms of 1941 prices and a national income of 105 billion dollars, and are defined as the base level. The diets of individuals in both farm and nonfarm family units increase in total poundage as incomes increase. Average dietsaries in farm families are enriched by sustained quantity increases in all the principal food groups except flour and cereals from the income class of under \$500 through the \$3,000-\$4,999 class.

The picture is somewhat similar for the nonfarm classification. But here with increased incomes the consumption trends are more steeply inclined than for the farm families. This is true, notably for milk or its equivalent, tomatoes and citrus fruit, and meat, poultry, and fish.

It is clear that the average dietaries of individuals living in or eating with families that have incomes of less than \$1,000 per year fall below recommended nutritional standards, and little distinction with respect to over-all adequacy may be made in this group between farm and non-farm classifications. Above the \$1,000-income level the extent and intensity of underconsumption varies between farm and nonfarm people. But in form it confines itself mainly to deficiencies in protective foods rather than to shortages in over-all poundage.

3. Total food requirements at the defined high level exceed those indicated at the base level in the majority of food groups. Moving from the base to the high level of consumption the most significant increase, both absolutely and percentagewise, occurs in the food groups, milk or its equivalent and in leafy green and yellow vegetables. But the magnitude of increase is appreciable for the food groups, tomatoes and citrus fruit, other vegetables and fruit, and meat, poultry, and fish in each instance.

In more favorable income situations than that indicated at the base level, whether measured in terms of all persons consuming at the \$3,000-\$4,999 level or in terms of a full-employment situation, total requirements increase in all food groups seriously deficient in the base-level situation. But the estimated quantities of milk and leafy green and yellow vegetables required to satisfy the condition of high-level food consumption for all persons in the United States as of 1950 clearly and substantially exceed total requirements (1) at the base level of consumption, (2) if all persons consumed at the \$3,000-\$4,999 income level, and (3) in a full-employment situation.

4. Achieving the high level of food consumption over the base level would have significant implications to the operating economy. In terms of the 1941 price level, additional consumer expenditures approximating 3.4 billion dollars would be required to achieve the high level over and above the base level of consumption. In a full-employment situation normal food expenditures, hence consumption, would tend to increase, so the discrepancy between actual consumption and the high level would be narrowed. Thus, achieving the high level of food consumption in a full-employment situation would probably not increase aggregate expenditures by more than 1.9 billion dollars in 1941 prices.

What part of these expenditures would probably reach farmer-producers? The answer to that question turns largely upon the assumption made regarding the flexibility of food supplies. If it is assumed, as it is in this analysis, that the output of food is not fixed through time but on the contrary is highly variable, then some 50 percent or 1.7 billion dollars of consumer expenditures, amounting to 3.4 billion dollars, would flow directly back to farmers. Of the total returns to farmers 1.1 billion dollars might be expected to flow directly back to dairy farmers.

5. A total volume of food output comparable to that achieved in 1943 would be heavily in excess of total requirements, foreign and domestic, at the *base level* of domestic consumption as of 1950. Total food output exceeds total requirements in 9 of the 11 food groups in that situation, the exceptions being other vegetables and fruit and sugar and other sweets of which the latter is without significance.

Total requirements, domestic and foreign, at the *high level* of domestic consumption are sufficiently large to eliminate the general surplus condition indicated at the base level, but output and requirements, food group by food group, fail to match with any reasonable degree of tolerance. Hence, achieving the high level of food consumption over the base level would ease the over-all surplus problem, but it would not eliminate the need for production adjustments.

But if the defined high level of food consumption, or something approaching it and international collaboration of the kind envisaged at the United Nations Conference on Food and Agriculture held at Hot Springs, Va., in 1943, are not realized by 1950, and if technological innovations continue to pour forth at the accelerated rate at which they have in recent years, agriculture's over-all capacity to produce will outrun consumption requirements and the total agricultural plant will be plagued with excess capacity, surplus supplies, and a persistent downward pressure on prices.

6. The underconsumption of food at the base level was found to take two different but related forms: (1) General undernourishment and (2) protective-food deficiencies. Thus, the development of programs intended to combat the underconsumption of food must necessarily vary in design. Undernourishment directly associated with low and inadequate incomes will be eliminated as a social evil only when the basic cause—insufficient income—is eliminated. Hence, a supplemental-income or purchasing-power approach to assist consumer units to increase their purchases of food, would appear to be an indispensable part of a national program designed to combat the underconsumption of food. Protective-food deficiencies, on the other hand, because they are common to all income groups, can probably best be reached through a broad educational approach. Indifference and ignorance must be combated universally even in the middle and upper income groups, among whom income limitations certainly are not a cause of food deficiencies.

But these two basic approaches to the problems of underconsumption may be materially strengthened by a third or service approach. New food-handling facilities must be provided and old food-handling facilities improved. These three approaches will not eliminate all types of malnutrition in the United States—particularly those resulting from inadequate scientific knowledge and destructive food handling and preparation—but they will go far toward achieving the defined high level of food consumption.

FOOD-CONSUMPTION LEVELS

HIGH-LEVEL DEFINED

What constitutes high-level food consumption? If the concept is to have meaning it must be more than a forecast of food consumption or an estimate of the maximum quantities of food that could be eaten in some future year. It must refer to an optimum level of food consumption shared by everyone. Optimum requirements may logically be measured in terms of (1) nutritional needs, (2) actual food consumption when income limitations are inoperative, or (3) some com-

bination of (1) and (2). But regardless of the standard selected for measuring high-level food consumption, the measurement tends to be relative rather than absolute. The capacity to consume, like the capacity to produce, depends upon the combination of input factors used—in this case food items consumed. Thus it is impossible to specify fixed quantities of particular foods unless a rigid rationing system may be anticipated—a condition which violates the principle of free consumer choice.

The nutritional standard may be conceived as a set of absolute nutrient requirements¹ expressed in terms of varying combinations of foods. Such items as food energy, protein, calcium, iron, and the vitamins, A, B, C, are required by the human body in fixed quantities, but the kinds of food and the poundage of foods that will satisfy those nutrient requirements can be varied. By reason of this relationship the Bureau of Human Nutrition and Home Economics can formulate (1) a low-cost diet weighted heavily by low-resource-using foods (for example, beans and cereals) and (2) a high-cost diet weighted heavily by high-resource-using foods (for example, meat and butter), and in both instances prescribe a nutritionally adequate diet.² In short, there are many combinations of food that will provide a nutritionally adequate diet; hence, there are many different patterns of food consumption which, taken in the aggregate, could represent high-level food consumption.

It is easier, perhaps, to define high-level food consumption in terms of probable actual consumption when income limitations are not permitted to restrict the purchase of food. This is essentially the procedure that W. H. Lough (9)³ employs in his work, *High Level Consumption—Its Behavior; Its Consequences*. And if it may be assumed that in the aggregate that all persons are fundamentally alike, and will behave in approximately the same ways when placed in similar situations, then the actual consumption patterns of individuals in the highest income bracket may be defined as high-level food consumption. But this measure of high-level food consumption will not hold over a period of time, for food habits change with education, with the appearance of new foods, and with consumption fads. Further, even though this measure takes into consideration the wishes of individuals with respect to different foods more completely than the nutritional yardstick, it is unreliable in that individuals may be consuming relatively large quantities of foods of their choice and yet be suffering from malnutrition.

High-level food consumption as measured by the absence of income restrictions may then be absolute as of a given time, but that yardstick is likely to be fallacious in that the consumption it measures will not adequately sustain the human body. Thus, this measure is valuable as a key to the tastes and desires of individual consumers, but it cannot be justified as a goal of a program intended to provide a nutritionally adequate diet.

¹ These allowances, of course, would vary according to the physical characteristics and activity of the population concerned. And as the science of nutrition progresses, present-day nutrient requirements probably will be modified.

² See UNITED STATES BUREAU OF HOME ECONOMICS. PLANNING DIETS BY THE NEW YARDSTICK OF GOOD NUTRITION; LOW COST, MODERATE COST, LIBERAL. 14 pp. [1941] [Processed.]

³ Italic numbers in parentheses refer to Literature Cited, p. 48.

The measure of high-level food consumption, attempted in this analysis for the year 1950, in reality is a combination of the two methods described. An objectively arrived-at set of nutrient requirements⁴ expressed in terms of a *specific combination of foods at moderate cost* (table 1) is inserted, so to speak, into an indicated actual pattern of food consumption at each income level for each food group, at that point where actual consumption falls seriously below the previously determined adequate level. This floor of nutritional adequacy in effect raises the per capita consumption of food in those food groups which are underconsumed relative to the level prescribed in the adequate diet, and leaves unchanged the rate of consumption in those food groups which are overconsumed relative to the adequate diet.⁵

TABLE 1.—*Minimum food requirements at the good adequate level¹ (per capita—per year)*

Food groups	Farm (single person)	Farm family	Nonfarm (single person)	Nonfarm family
	Pounds	Pounds	Pounds	Pounds
Milk or its equivalent ² -----	611	656	578	651
Potatoes and sweetpotatoes-----	215	167	176	145
Dry beans and peas, and nuts-----	18	13	15	11
Tomatoes and citrus fruit-----	103	100	104	100
Leafy green and yellow vegetables-----	160	155	165	159
Other vegetables and fruit-----	239	206	221	197
Eggs-----	37.5	37.5	37.5	37.5
Meat, poultry, and fish-----	167	135	154	125
Flour and cereals (baked goods equivalent) ³ -----	270	205	207	170
Butter and other fats ⁴ -----	82	61	68	52
Sugar and other sweets-----	82	61	68	52

¹ These data were provided by the Bureau of Human Nutrition and Home Economics, and are based on the prewar moderate cost diet weighted for age and activities of the population as of 1942.

² Fluid whole milk and equivalent quantities (approximate protein solids basis) of evaporated and dried milk, ice cream, cheese, and skim-milk products; does not include milk from which only cream or butter-fat is used for human consumption. See FAMILY FOOD CONSUMPTION IN THE UNITED STATES (19, footnote 9, p. 6.).

³ Flour and cereals plus equivalent quantities of flour in baked goods purchased at retail and carried into the homes.

⁴ Includes bacon and salt side as well as butter, margarine, lards, and other table and cooking fats.

This measure of high-level food consumption assumes that the individual will consume according to his choice as long as the consumption of a food group does not fall seriously below the adequate level. But where either income or taste acts to reduce consumption below the nutritional minimum, the quantity required to provide that minimum is taken as the per capita measure of consumption.

⁴ Recommended by the Food and Nutrition Board, National Research Council.

⁵ A measure of high-level food consumption known as the "best adapted diet" was developed by O. V. Wells of the Bureau of Agricultural Economics in 1942. It was conceived to be "a diet best adapted to current economic resources. . . . [assuming] all low-income families would follow a low-cost diet plan all average or moderate-income families a moderate-cost plan, and all high-income families a liberal diet plan. ESTIMATES OF QUANTITIES OF FOOD NECESSARY TO PROVIDE CERTAIN SPECIFIED DIETS AND CROP ACREAGES AND NUMBERS OF LIVESTOCK REQUIRED FOR INDICATED PRODUCTION, statement by Bureau of Agricultural Economics before Select Committee investigating National Defense Migration, House of Representatives, 77 Cong., 2d sess., H. Res. 113, p. 10779. (February 13, 1942). This standard was not used in this analysis for two principal reasons: (1) It would be extremely difficult in practice to know at which specific income levels the three diets should go into effect and (2) the composition of the low-cost diet is such that many persons would not follow the low-cost diet plan unless the food were rationed to them.

Certain value judgments had to be exercised in computing this measure of high-level food consumption, such as determining the specific adequate diet. And it is true that the aggregate quantities of food taken to represent high-level food consumption in the United States as of 1950 could reasonably be greater or smaller according to the judgment exercised in determining the specific combination of foods or food budget used as a floor to individual food consumption. But to avoid endless controversy on this score and to ground the judgment in reality an adequate diet was selected which in fact represents domestic dietary habits and customs at moderate cost.

High-level food consumption as of 1950 may then be defined for purposes of this analysis as a situation wherein all persons in the United States receive "good adequate diets as a minimum." The modifiers of the word, "diet," have a special connotation here. "Good" refers to a diet which is tasty in accordance with domestic eating habits, but not elaborate or pretentious. "Adequate" refers to a diet which is nutritionally efficient—not dangerously lacking in any elements necessary to good health. The phrase, "as a minimum," is added to indicate that consumption at a higher level, more elaborate, more expensive than the minimum is compatible with the definition, but the minimum must be satisfied. To repeat, this definition of high-level food consumption has no upward restrictions, but it does have a floor of nutritional adequacy.

BASE-LEVEL CONSUMPTION

The base-level food-consumption patterns by income groups provide a base for the analysis which follows—hence the name, base level. Those consumption patterns are assumed to represent United States dietaries as of 1950, provided specially designed food programs are not in operation in that year to supplement "normal" expenditures, hence the consumption of food. The economic situation at the base level as of 1950 is assumed to be colorless—conveniently spaced between prosperity and depression—under a net national income of 105 billion dollars in terms of 1941 prices.⁶ In brief, the base-level patterns represent an attempt to isolate a measure of food consumption as of some future date under moderately depressed economic conditions. This situation is not intended as a forecast, but rather as a working assumption representative of possible developments.

Actually the patterns of food consumption at the base level are estimates of food consumption by income groups for the prewar year 1941,⁷ and the increase in net national income from the estimate of 96.9 billion dollars to 105 billion as of 1950 is accounted for by the assumed natural population increase from 1941 to 1950. The logic of using the 1941 estimates as the base level may be summarized as follows: (1) 1941 was the last prewar year, hence the last period in which peacetime dietaries could be estimated for purposes of extrapolation into a postwar situation, (2) the level of economic activity in 1941 with the consequent income and price relationships seemed to fit the situation contemplated for the base level, and (3) some preliminary estimates of food consumption and expenditure patterns were avail-

⁶ Agrees with the estimates for 1950 with 7 million unemployed, as found in *WHAT PEACE CAN MEAN TO AMERICAN FARMERS. POST-WAR AGRICULTURE AND EMPLOYMENT* (21).

⁷ The base level of food consumption as of 1950 assumes the same composition of foods, consumer preferences, and relative prices that existed in 1941.

able for the year 1941.⁸ The most recent estimates of per capita food consumption for one week in the spring of 1942 were not used for two principal reasons (19): (1) War influences could not be isolated (for example, food shortages, rationing, rising incomes) to yield typical peacetime dietaries and (2) no convenient or satisfactory procedure could be devised to adjust for seasonal variations in food consumption and thus arrive at annual per capita estimates of consumption.

Per capita patterns of food consumption for farm and nonfarm family consumer units by different income groups at the base level are shown in tables 2 and 3.⁹ Although these family food data may be in error in specific cases the contours of the consumption patterns appear reasonable and representative of family dietaries in 1941.¹⁰ The per capita patterns for single individuals, farm and nonfarm, are not presented here since these patterns are uncertain and unreliable. Per capita patterns of food consumption for single individuals were derived to obtain a total food picture—to ascertain total requirements—but it would be unwise to use these consumption data for single individuals in a more precise manner. However, the failure to evaluate the dietaries of single individuals who eat as single individuals is not seriously damaging to the analysis since less than 5 percent of the estimated population in 1950 is involved after an allowance has been made for single individuals who board with family units.

Certain very definite trends may be observed in the per capita patterns presented in tables 2 and 3. The dietaries of individuals in both farm and nonfarm family units increase in total poundage as incomes increase. Individual diets in farm families are enriched by sustained quantity increases in all the principal food groups except flour and cereals, beginning with the group with incomes under \$500 and extending through the group with incomes of from \$3,000 to \$4,999. The picture is somewhat similar for those in the nonfarm classification. With increased incomes consumption trends for this group are more steeply inclined than for farm families. This is true notably with respect to the consumption of milk or its equivalent, tomatoes or citrus fruit, and meat, poultry, and fish.

The adequacy of per capita food consumption in farm and nonfarm families at the base level as judged by the good adequate nutritional standard may also be seen in tables 2 and 3. The diets of individuals living in or eating with family consumer units having incomes of less than \$1,000 are clearly inadequate, and little distinction with respect to over-all adequacy may be made between the farm and nonfarm

⁸ UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS, THE NATIONAL FOOD SITUATION, NFS-1, 20 pp., illus. 1942. [Processed.] (See pp. 17-20.) Although certain of the basic computations and procedures by which these data were derived were used in this study, the published figures were not. The 1941 estimates used in this study are based upon the 1935-36 consumer-purchases data, and were extrapolated forward in accordance with changes in total domestic disappearance. Hence, valid criticisms of the consumer-purchases data apply to these 1941 estimates. Further, the unreliability of holding consumption patterns constant from 1936 to 1950 should be recognized.

⁹ The per capita consumption of 35 specific food items that were combined into the 11 food groups are shown in tables 15 and 16, pp. 45 and 46.

¹⁰ These estimates of per capita food consumption by income groups when placed on a national per capita basis check with the Bureau of Agricultural Economics average per capita series, after allowances are made for quantities used in food manufacturing and marketing wastes. In the case of leafy green and yellow vegetables the estimates of per capita consumption among farm families appear to be unusually high in light of the basic 1935-36 data. These rates of consumption can be reconciled to total domestic disappearance in 1941, but not to 1935-36 consumer-purchases data.

TABLE 2.—*Per capita consumption of food among farm families by income groups at the base level, 1941, and percentage of nutritional adequacy¹*

Food groups	Under \$500 ²		\$500-\$999 ²		\$1,000-\$1,499 ²		\$1,500-\$1,999 ²		\$2,000-\$2,999 ²		\$3,000-\$4,999 ²		\$5,000 and over ²		
	Con- sumption	Ade- quacy	Con- sumption	Ade- quacy	Con- sumption	Ade- quacy	Con- sumption	Ade- quacy	Con- sumption	Ade- quacy	Con- sumption	Ade- quacy	Con- sumption	Ade- quacy	
Milk or its equivalent ⁴	461.6	70.4	542.6	82.8	600.7	91.6	648.9	99.0	681.2	103.9	663.8	101.2	741.4	113.1	
Potatoes and sweetpotatoes	102.8	61.6	135.6	81.2	206.9	21.6	126.7	21.6	224.6	26.5	161.4	242.4	145.4	145.4	
Dry beans and peas, and nuts	15.3	117.7	15.1	116.2	19.9	153.1	19.1	146.9	18.8	144.6	22.6	173.8	26.1	200.8	200.8
Tomatoes and citrus fruit	29.2	38.5	51.5	51.5	56.4	56.4	67.3	67.3	73.9	73.9	90.5	90.5	90.5	90.5	
Leafy green and yellow vegetables	102.4	66.1	107.6	69.4	120.7	77.9	130.5	84.2	143.7	92.7	157.7	101.7	99.8	64.4	
Other vegetables and fruit	206.1	100.0	203.4	99.7	218.6	106.1	234.3	113.7	279.6	135.7	364.7	177.0	250.3	121.5	
Eggs	22.4	59.7	27.6	73.6	36.1	96.3	43.0	114.7	46.6	124.3	46.6	124.3	47.6	126.9	126.9
Meat, poultry, and fish	70.7	52.4	82.7	61.3	117.8	37.3	131.4	97.3	150.6	111.6	175.2	129.8	189.7	140.5	140.5
Flour and cereals (baked goods equivalent)	255.0	124.4	241.6	117.9	222.5	108.5	213.9	104.3	204.4	99.7	220.5	107.6	218.6	104.2	104.2
Butter and other fats ⁴	59.2	97.0	61.9	101.5	60.1	98.5	59.0	96.7	58.3	95.6	71.1	116.6	73.0	119.7	119.7
Sugar and other sweets ⁴	64.4	105.6	70.7	115.9	82.3	134.9	85.2	139.7	92.9	152.3	97.6	160.0	94.9	155.6	155.6

¹ Relative to the minimum nutritional standard presented in table 1.² Money plus nonmoney income.³ Retail weights.⁴ These estimates of per capita consumption are slightly understated relative to the average per capita series of the Bureau of Agricultural Economics, since certain quantities used in the manufacturing are not included here. This fact is taken into consideration in the Bureau of Human Nutrition and Home Economics diet plans, hence the measure of adequacy is a proper one.

TABLE 3.—*Per capita consumption of food among nonfarm families by income groups at the base level, 1941, with percentage of nutritional adequacy¹*

Food groups	Under \$500 ²		\$500-\$999 ²		\$1,000-\$1,499 ²		\$1,500-\$1,999 ²		\$2,000-\$2,999 ²		\$3,000-\$4,999 ²		\$5,000 and over ²		
	Consumption Pounds ³	Adequacy Percent	Consumption Pounds ³		Adequacy Percent		Consumption Pounds ³		Adequacy Percent		Consumption Pounds ³		Adequacy Percent		
			Consumption Pounds ³	Adequacy Percent											
Milk or its equivalent ⁴	180.2	27.7	299.3	45.9	366.6	56.3	381.0	58.5	408.7	62.8	435.2	66.8	510.2	78.3	
Potatoes and sweetpotatoes	85.9	59.2	117.9	81.3	117.1	80.8	118.6	81.8	117.7	81.2	113.5	78.3	124.2	85.7	
Dry beans and peas, and nuts	14.1	128.2	15.0	136.4	13.9	126.4	12.4	112.7	11.4	103.6	10.7	110.5	13.7	124.5	13.7
Tomatoes and citrus fruit	25.6	25.6	55.8	55.8	77.5	96.7	96.7	96.7	116.7	116.7	141.3	141.3	193.0	193.0	
Leafy green and yellow vegetables	39.0	24.5	56.5	35.5	67.1	42.2	77.6	48.8	86.1	54.2	93.1	59.8	117.4	73.8	
Other vegetables and fruit	98.5	50.0	148.8	75.5	189.3	96.1	225.6	114.5	255.7	129.8	301.8	163.2	426.7	216.6	
Legs ⁴	22.1	58.9	32.0	85.3	35.3	94.1	37.6	100.3	39.4	105.1	40.3	107.5	45.8	122.1	45.8
Meat, poultry, and fish	73.8	59.0	114.2	91.4	135.5	108.4	152.9	122.3	170.0	136.0	192.7	154.2	265.4	212.3	
Flour and cereals (baked goods equivalent)	280.6	165.1	197.0	115.9	179.2	105.4	174.4	102.6	174.9	102.9	169.3	99.6	197.8	116.4	
Butter and other fats ⁴	66.5	127.9	59.8	115.0	113.7	60.2	115.8	61.3	117.9	63.1	121.3	73.4	141.2	141.2	
Sugar and other sweets ⁴	93.7	180.2	90.3	173.7	95.8	184.2	94.4	181.5	96.7	186.0	97.3	187.1	121.2	233.1	233.1

¹ Relative to the minimum nutritional standard presented in table 1.² Money plus nonmoney income.³ Retail weights.⁴ These estimates of per capita consumption are slightly understated relative to the average per capita series of the Bureau of Agricultural Economics, since certain quantities used in the manufacturing are not included here. This fact is taken into consideration in the Bureau of Human Nutrition and Home Economics diet plans, hence the measure of adequacy is a proper one.

classifications. These dietaries suffer from both insufficient quantities of food and deficiencies in the vital protective foods. But it is also clear that the pangs of hunger are mitigated and perhaps avoided by heavy consumption in the cheap energy-producing foods such as flour and cereals and sugars.

It would seem that the average individual subsisting on diets common to family units with incomes of less than \$1,000 could scarcely avoid serious malnutrition; and at the base level as of 1950 approximately 31 million family members would fall within this classification.¹¹ In

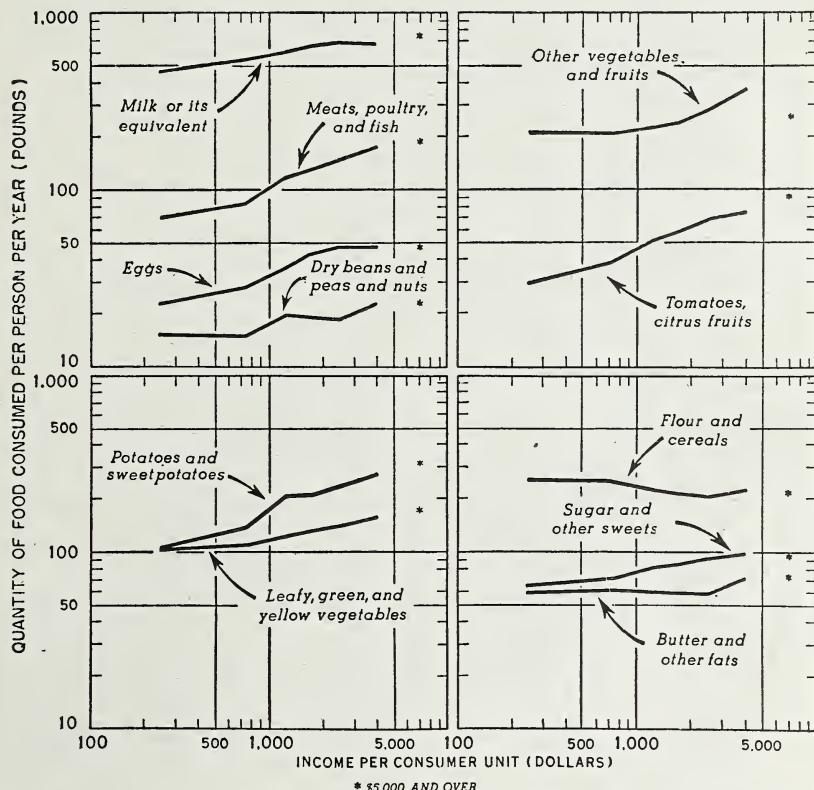


FIGURE 1.—Per capita consumption of major food groups related to income, farm family consumer units, United States, 1941.

other words, the diets of more than one-fifth of the total population, not including single individuals, would probably fall below any reasonable standard of adequate nutrition if a net national income of 105 billion dollars should materialize as of 1950.

Above the \$1,000 income level the extent and intensity of underconsumption varies considerably between farm and nonfarm people,

¹¹ See table 18, page 47, for a distribution of the assumed population of 144 million by income groups with boarders included with family units in which they board.

but in form it confines itself mainly to deficiencies in protective foods rather than shortages in over-all poundage. Farm families with incomes between \$1,000 and \$1,999 have respectable if not desirable diets with the exception of two food groups, tomatoes and citrus fruits, and leafy green and yellow vegetables. Also, the dietaries of nonfarm families in this income bracket are greatly improved over those below \$1,000, although the diets remain critically short in the protective foods, leafy green and yellow vegetables, and milk or its equivalent. Above the \$2,000 income level, underconsumption assumes the almost

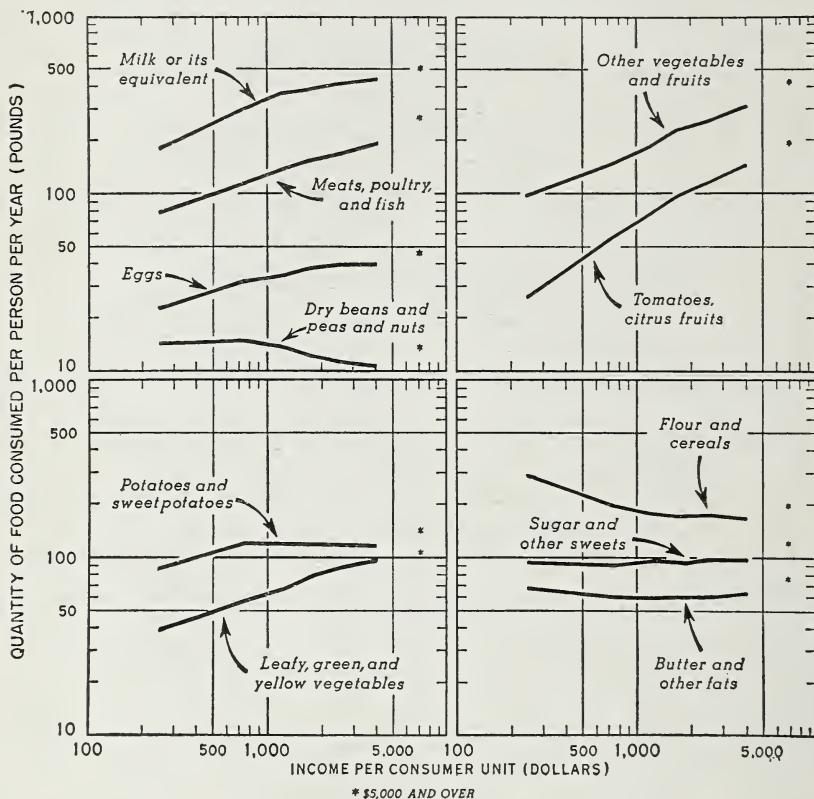


FIGURE 2.—Per capita consumption of major food groups related to income, non-farm family consumer units, United States, 1941

exclusive form of deficiencies in protective foods. Nonfarm people have a tendency to underconsume leafy green and yellow vegetables and milk or its equivalent, while farm people tend to underconsume tomatoes and citrus fruit.

The diets of individuals living in or eating with farm families who have incomes from \$2,000 to \$4,999 come nearest to approaching nutritional adequacy of any segment of the population, and at the same time reflect the tastes and food habits of the people of the United

States.¹² At the income level, \$5,000 and over, especially in the dietaries of nonfarm family units, the consumption of certain food items—meat, other vegetables and fruit, and sugar—is excessively large relative to the minimum standard. The apparent per capita intake of calories at this income level exceeds optimum requirements to the extent that such dietaries would be harmful unless the excesses are wasted in preparation and at the dining table. This probably happens.

To summarize, two features concerning food consumption at the base level as of 1950 stand out above all others: (1) The serious condition of undernourishment to which the average individual living in or eating with family units who have less than \$1,000 income per year is subjected and (2) the tendency for family members of all income classes to consume less than the optimum quantities of protective foods, for example, milk or its equivalent, tomatoes and citrus fruit, and leafy green and yellow vegetables.

The deficiencies in the dietaries of farm and nonfarm family members at the base level would seem to stem from two basic causes, (1) insufficient income and (2) insufficient knowledge. The serious condition of undernourishment indicated for the two lowest income groups probably can be explained by a combination of these two causes—each complementing and abetting the other—while in the high-income groups the deficiencies in the protective foods can be explained only by lack of knowledge or interest.

Just where the line of demarcation falls between the high- and the low-income groups is rather obscure. Individual dietaries improve consistently as incomes increase through the \$3,000-\$4,999 class. But the income range, \$1,000 to \$1,999, might be considered the twilight zone in which the causal factor, restricted income, fades away, leaving insufficient knowledge of food values as the dominant causal element of inadequate nutrition.

To ascertain total food requirements at the base level as of 1950 it was necessary to assume (1) a total population as of 1950 and (2) a distribution of that population by income groups. The population figure for 1950—144 million—is based on an estimate of the National Resources Planning Board, which assumes medium fertility, medium mortality, no immigration, and no war losses. (23, p. 268) The population figure of 144 million was distributed according to the pattern of income distribution in 1935-36 as “blown up” to the net national income of 1941, namely 96.9 billion dollars. This income distribution was then adjusted for estimates of single individuals boarding with family units—that is, single individuals boarding out were distributed according to the incomes of the family-consumer units in which they boarded.¹³ Finally, total food requirements at the base level were obtained by multiplying the number of individuals in each income class, adjusted for single boarders, by the per capita food consumption at the base level for each income class. These total food requirements are presented in table 4.

¹² For a comparison with these findings see ratings of family diets in the United States by Margaret G. Reid (13, p. 334).

¹³ See tables 17 and 18, pp. 46 and 47.

TABLE 4.—*Quantities of food required to satisfy the condition of base-level consumption for all persons in the United States (assumed conditions for year 1950)*

Food groups	Farm		Nonfarm		Institutional	Total consumption
	Single persons	Persons in families	Single persons	Persons in families		
	<i>Mil lb¹</i>					
Milk or its equivalent	166.7	17,930.7	3,502.5	39,653.8	688.4	² 68,770.1
Potatoes and sweetpotatoes	73.9	5,681.4	1,116.4	12,132.3	271.2	³ 19,275.2
Dry beans and peas, and nuts	7.7	548.0	126.3	1,327.6	34.5	³ 2,332.1
Tomatoes and citrus fruit	19.8	1,556.4	884.8	10,522.7	128.3	13,112.0
Leafy green and yellow vegetables	51.3	3,706.1	710.9	8,124.1	130.0	12,722.4
Other vegetables and fruit	97.7	7,230.5	2,078.4	24,173.1	342.2	33,921.9
Eggs	14.1	1,089.5	346.5	3,863.1	73.6	⁴ 5,497.8
Meat, poultry, and fish	44.8	3,540.1	1,429.8	16,351.0	262.7	21,628.4
Flour and cereals (baked goods equivalent)	103.8	6,771.6	1,850.7	19,335.1	453.1	28,514.3
Butter and other fats	27.0	1,837.9	600.1	6,469.7	137.5	⁵ 10,108.2
Sugar and other sweets	33.8	2,432.3	929.9	10,095.6	207.7	⁶ 17,591.7

¹ Retail weights.

² Includes 6,828 million pounds used in manufacturing not distributed as milk by income groups.

³ Includes 288 million pounds of nuts used in manufacturing not distributed by income groups.

⁴ Includes 111 million pounds of eggs used in manufacturing not distributed by income groups.

⁵ Includes 1,036 million pounds used in manufacturing not distributed as fats and oils by income groups.

⁶ Includes 3,892 million pounds used in manufacturing not distributed as sugar by income groups.

HIGH-LEVEL CONSUMPTION

A measure of the adequacy of food consumption at the base level relative to the good adequate minimum was formulated in the previous section. The estimates of high-level food consumption are built upon that basic comparison. In theory, where actual consumption of a food group at the base level exceeds the good adequate minimum, the actual consumption is taken as the measure of high-level consumption, and where the actual falls below the good adequate minimum, the latter is substituted for the former. The measure of high-level food consumption is simply the higher rate of consumption obtained in the comparison between the base level and the good adequate minimum.

In applying the procedure to the actual data, however, the decision was made to substitute the good adequate minimum for the actual only where the actual was found to fall seriously below the minimum standard, since a safety factor of 20 to 30 percent is incorporated into the recommended dietary allowances of the Food and Nutrition Board. Thus, the minimum standard was substituted in all cases where the actual food consumption was found to be less than 90 percent adequate, except for potatoes and sweetpotatoes in which case approximately 80 percent of adequacy was taken as the point at which the minimum standard of consumption¹⁴ was substituted. These modi-

¹⁴ Because the average per capita caloric intake is maintained rather well in the low-income brackets and is excessive in the high-income brackets due to overconsumption in the related food groups—flour and cereals, fats and oils, and sugar and other sweets—the decision was made to lower the point at which substitution was made for potatoes to approximately 80 percent of adequate. Further, consumption trends for potatoes in the recent past have been clearly downward. (See United States Bureau of Agricultural Economics, THE NATIONAL FOOD SITUATION, NFS-19, 13 pp., illus., 1944. [Processed].) Thus, it seemed unlikely that consumption could be raised in fact to 100 percent of adequate in this particular food group.

fications were adopted to minimize the possibility of overstating per capita and total food requirements at the high level of food consumption.

The line of demarcation between the good adequate minimum of food consumption and actual consumption at the base level is indicated in tables 5 and 6. Although the dietaries of individuals living in or eating with both farm and nonfarm families in the lowest income brackets were found to be nutritionally deficient and lacking in foods

TABLE 5.—*The point at which the good adequate minimum of food consumption is substituted for actual consumption among farm families* ¹

Income class ²	Per capita consumption—percent of adequacy ³										
	Milk or its equivalent	Pota-toes and sweet-pota-toes	Dry beans and peas, and nuts	Toma-toes and citrus fruit	Leafy green and yellow vegetables	Other vegetables and fruit	Eggs	Meat, poultry, and fish	Flour and cereals (baked goods equivalent)	Butter and other fats	Sugar and other sweets
	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
Under \$500	70.4	61.6	117.7	29.2	66.1	100.0	59.7	52.4	124.4	97.0	105.6
\$500-\$999	82.8	81.2	116.2	38.5	69.4	99.7	73.6	61.8	117.9	101.5	115.9
\$1,000-\$1,499	91.6	123.9	153.1	51.5	77.9	106.1	96.3	87.3	108.5	98.5	134.9
\$1,500-\$1,999	99.0	126.7	146.9	56.4	84.2	113.7	114.7	97.3	104.3	96.7	139.7
\$2,000-\$2,999	103.9	140.5	144.6	67.3	92.7	135.7	124.3	111.6	99.7	95.6	152.3
\$3,000-\$4,999	101.2	161.4	173.8	73.9	101.7	177.0	124.3	129.8	107.6	116.6	160.0
\$5,000 and over	113.1	145.1	200.8	90.5	64.4	121.5	126.9	140.5	104.2	119.7	155.6

¹ The good adequate minimum of food consumption is substituted for actual consumption for all cases within the heavy lines.

² Money plus nonmoney income.

³ Based on data from table 2.

TABLE 6.—*The point at which the good adequate minimum of food consumption is substituted for actual consumption among nonfarm families* ¹

Income class ²	Per capita consumption—percent of adequacy ³										
	Milk or its equivalent	Pota-toes and sweet-pota-toes	Dry beans and peas, and nuts	Toma-toes and citrus fruit	Leafy green and yellow vegetables	Other vegetables and fruit	Eggs	Meat, poultry, and fish	Flour and cereals (baked goods equivalent)	Butter and other fats	Sugar and other sweets
	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
Under \$500	27.7	59.2	128.2	25.6	24.5	50.0	58.9	59.0	165.1	127.9	180.2
\$500-\$999	45.9	81.3	136.4	55.8	35.5	75.5	85.3	91.4	115.9	115.0	173.7
\$1,000-\$1,499	56.3	80.8	126.4	77.5	42.2	96.1	94.1	108.4	105.4	113.7	184.2
\$1,500-\$1,999	58.5	81.8	112.7	96.7	48.8	114.5	100.3	122.3	102.6	115.8	181.5
\$2,000-\$2,999	62.8	81.2	103.6	116.7	54.2	129.8	105.1	136.0	102.9	117.9	186.0
\$3,000-\$4,999	66.8	78.3	97.3	141.3	59.8	153.2	107.5	154.2	99.6	121.3	187.1
\$5,000 and over	78.3	85.7	124.5	193.0	73.8	216.6	122.1	212.3	116.4	141.2	233.1

¹ The good adequate minimum of food consumption is substituted for actual consumption for all cases within the heavy lines.

² Money plus nonmoney income.

³ Based on data from table 3.

that are considered tasty by social standards, the good adequate minimum could not be substituted in total for the actual pattern of consumption in any income class. For farm families the minimum standard of consumption is substituted for the actual in the food groups, milk or its equivalent, potatoes and sweetpotatoes, and eggs, in the groups with incomes of \$0 to \$999; meat, poultry, and fish for those with incomes of \$0 to \$1,499; leafy green and yellow vegetables for those in the income range \$0 to \$1,999; and tomatoes and citrus fruits for those in the income range \$0 to \$4,999. For nonfarm families the minimum standard of consumption is substituted for the actual in the food groups meat, poultry, and fish, and potatoes and sweetpot-

TABLE 7.—*Quantities of food required to satisfy the condition of high-level consumption for all persons in the United States (assumed conditions for year 1950)*

Food groups	Farm		Nonfarm		Institutional	Total consumption
	Single persons	Persons in families	Single persons	Persons in families		
Milk or its equivalent	182.9	19,408.3	3,864.4	68,396.3	1,498.2	¹ 100,178.1
Potatoes and sweetpotatoes	77.3	6,125.3	1,145.4	12,460.6	271.2	² 20,079.8
Dry beans and peas, and nuts	7.7	548.0	126.3	1,327.6	34.5	³ 2,332.1
Tomatoes and citrus fruit	30.5	2,984.7	952.1	12,028.3	230.0	⁴ 16,225.6
Leafy green and yellow vegetables	51.3	4,563.5	1,075.3	16,694.8	365.7	⁵ 22,750.6
Other vegetables and fruit	97.7	7,230.5	2,123.4	25,431.2	453.1	⁶ 35,335.9
Eggs	14.3	1,212.7	349.2	4,029.8	86.3	⁷ 4,803.3
Meat, poultry, and fish	52.6	4,249.8	1,456.4	16,635.4	262.7	⁸ 22,656.9
Flour and cereals (baked goods equivalent)	103.8	6,771.6	1,850.7	19,335.1	453.1	⁹ 28,514.3
Butter and other fats	27.0	1,837.9	600.1	6,469.7	137.5	¹⁰ 10,108.2
Sugar and other sweets	33.8	2,432.3	929.9	10,095.6	207.7	¹¹ 17,591.3

¹ Retail weights.

² Includes 6,828 million pounds used in manufacturing not distributed as milk by income groups.

³ Includes 288 million pounds of nuts used in manufacturing not distributed by income groups.

⁴ Includes 111 million pounds of eggs used in manufacturing not distributed by income groups.

⁵ Includes 1,036 million pounds used in manufacturing not distributed as fats and oils by income groups.

⁶ Includes 3,892 million pounds used in manufacturing not distributed as sugar by income groups.

⁷ Includes 3,892 million pounds used in manufacturing not distributed as sugar by income groups.

toes for those with incomes of under \$500; other vegetables and fruit and eggs for those with incomes of \$0 to \$999; tomatoes and citrus fruit for those with incomes \$0 to \$1,499; and milk or its equivalent and leafy green and yellow vegetables for those with incomes of \$0 to \$5,000 and over. This then is the procedure followed in determining at what income levels and in what food groups the good adequate minimum should be substituted for actual consumption at the base level for farm and nonfarm family members.¹⁵

The high-level estimates in table 7, indicating the quantities of food required to satisfy the condition of good adequate diets as a minimum for all persons in the United States as of 1950, were obtained by multiplying the number of individuals in each income class by the per

¹⁵ The same general procedure was followed for single individuals, but as the data are unreliable the points of substitution are not shown here.

capita food requirements for each food group. The per capita requirements are based not upon projected demand, but upon the base-level pattern of consumption above the specific nutritional minimum—and on that nutritional minimum where base-level consumption falls seriously below it. In a sense it is a timeless concept; actually however, the patterns of consumption at the base level will change with shifts in eating habits and the nutritional standard will change with additions to the fund of nutritional knowledge—hence the quantitative statement of high-level food consumption must change through time.

But if the base level shifts as it would with changes in the net national income, and consumer units shift into higher or lower income classes, the relationship between actual and high-level requirements would be altered. With an increase in the net national income the spread between total requirements at the base level and the high level would be narrowed, and vice versa. But the gap between the two sets of requirements would never completely close with an increase in the net national income, other things being equal, because all of the discrepancy is not due to limitations of individual income—the element of insufficient knowledge is also a cause of the divergence.

Obviously many difficulties were encountered in developing these total requirements at a high level of food consumption. The classification of food items in the basic data was not readily adaptable to the conventional food groups employed by nutritionists; food data taken from different sources were not of comparable weights; information concerning the distribution of income and patterns of expenditure was found to be out of date and unreliable; and the forecasting of economic activity is always hazardous even in the form of working assumptions. In some instances, these difficulties were overcome by arbitrary decisions, and in others by refining of the data. Thus, it should be recognized that these estimates represent first approximations—and not specific answers. However, it is believed that these approximations are representative of total requirements as defined, and that as defined they are realistic and achievable requirements.

TOTAL REQUIREMENTS COMPARED

Total food requirements at high and base levels of food consumption are summarized and compared in table 8. As would be expected, requirements at the high level of consumption exceed those indicated at the base level in the majority of food groups. Moving from the base level to the high level the most significant increases, both absolutely and percentagewise, occur in the food groups, milk or its equivalent and leafy green and yellow vegetables. But the magnitude of increase for the food groups—tomatoes and citrus fruit, other vegetables and fruit, and meat, poultry, and fish—is appreciable in each instance. In general terms, 48 billion pounds more food is required to provide all persons in the United States as of the year 1950 with good adequate diets as a minimum than would be required at the base level of consumption. And almost two-thirds of this poundage, or 31.4 billion pounds, takes the form of milk or milk products, excluding butter.

Achieving the high level of consumption defined by good adequate diets as a minimum would have profound effects upon the composition

of dietaries in the United States. The per capita consumption of fluid milk or its equivalent, leafy green and yellow vegetables, tomatoes and citrus fruit would be increased through broad segments of the population. And these data, indicating the direction in which per capita food consumption must move if the high level of food consumption is to be realized, substantiate the conclusions of Henry C. Sherman (15, p. 135), who states:

The combined evidence now shows clearly that starting with ordinary or typical American dietaries of all economic levels, the chief direction for nutritional improvement is to increase the proportion of fruits, vegetables, and milk in its various forms; and that such improvement even of dietaries already adequate and supporting a level of health already normal results in better growth and development, higher attainment in stamina and working efficiency, and a longer lease of healthier and more useful and satisfying life.

TABLE 8.—*A comparison of total food requirements at high and base levels of consumption in the United States (assumed conditions for year 1950)*

Food groups	High-level	Base-level	Discrepancy
	consumption	consumption	between levels
	Mil lb ¹	Mil lb ¹	Mil lb ¹
Milk or its equivalent	100,178.1	68,770.1	+31,408.0
Potatoes and sweetpotatoes	20,079.8	19,275.2	+804.6
Dry beans and peas, and nuts	2,332.1	2,332.1	-
Tomatoes and citrus fruit	16,225.6	13,112.0	+3,113.6
Leafy green and yellow vegetables	22,750.6	12,722.4	+10,028.2
Other vegetables and fruit	35,335.9	33,921.9	+1,414.0
Eggs	5,803.3	5,497.8	+305.5
Meat, poultry, and fish	22,656.9	21,628.4	+1,028.5
Flour and cereals (baked goods equivalent)	28,514.3	28,514.3	-
Butter and other fats	10,108.2	10,108.2	-
Sugar and other sweets	17,591.3	17,591.3	-

¹ Retail weights.

TABLE 9.—*A comparison of total food requirements at the high level and at the \$3,000-\$4,999 income level of consumption in the United States (assumed conditions for year 1950)*

Food groups	High-level	\$3,000-\$4,999	Discrepancy
	consumption	income level	between levels
	Mil lb ¹	Mil lb ¹	Mil lb ¹
Milk or its equivalent	100,178.1	78,811.0	+21,367.1
Potatoes and sweetpotatoes	20,079.8	21,463.9	-1,384.1
Dry beans and peas, and nuts	2,332.1	2,224.7	+107.4
Tomatoes and citrus fruit	16,225.6	18,782.8	-2,557.2
Leafy green and yellow vegetables	22,750.6	15,917.0	+6,833.6
Other vegetables and fruit	35,335.9	46,394.1	-11,058.2
Eggs	5,803.3	6,242.1	-438.8
Meat, poultry, and fish	22,656.9	27,874.0	-5,217.1
Flour and cereals (baked goods equivalent)	28,514.3	26,508.9	+2,005.4
Butter and other fats	10,108.2	10,604.2	-496.0
Sugar and other sweets	17,591.3	18,413.0	-821.7

¹ Retail weights.

As the trend in food-consumption habits has been in this direction for two decades,¹⁶ the attainment of the increases indicated for the high level of consumption does not appear impossible (fig. 3).

¹⁶ See footnote 8, p. 8. Also see NFS-6, 29 pp., illus. 1943; NFS-14, 18 pp., illus. 1944; and NFS-18, 20 pp., illus. 1944.

The quantities of food required to satisfy the conditions of good adequate diets as a minimum for all persons in the United States are compared in table 9 with total food requirements, assuming all individuals followed the food-consumption pattern of those in consumer units with incomes ranging between \$3,000 and \$4,999. The income group \$3,000-\$4,999 was used rather than the group with incomes of \$5,000 and over, because sufficient income is available to this group to allow them to consume food according to personal taste, but not to be pretentious or conspicuous in satisfying this taste. This comparison is particularly meaningful in that it illustrates the variation in total requirements under two basically different standards of measurement: (1) A situation wherein the consumption of food is not limited by size of income and (2) a situation wherein all persons receive as a

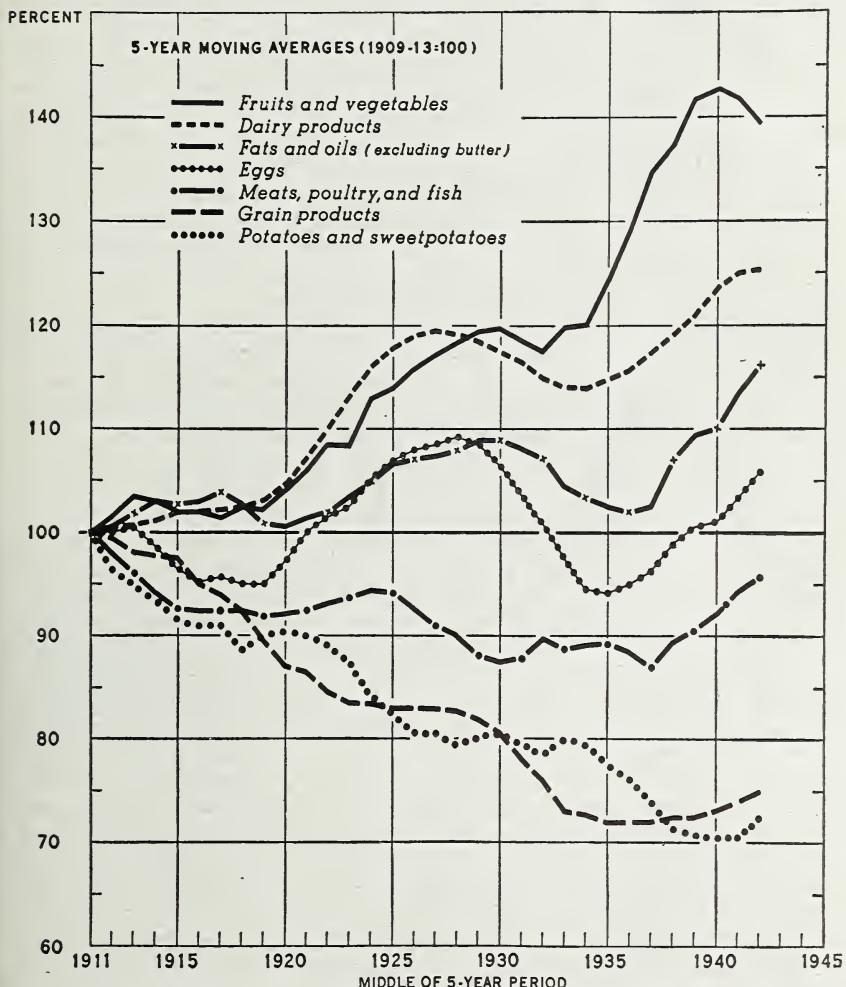


FIGURE 3.—Trends in per capita consumption of foods, by groups

minimum a nutritionally adequate diet. It should be clearly recognized, however, that the specific combination of foods in the defined high level of consumption, wherein all persons receive good adequate diets as a minimum, represents only one combination of foods which might be used to satisfy the conditions of nutritional adequacy.

On the surface, no particular pattern manifests itself in this comparison. Total requirements at the high level significantly exceed those at the \$3,000-\$4,999 consumption level for milk or its equivalent, leafy green and yellow vegetables, and flour and cereals; conversely, total requirements at the \$3,000-\$4,999 consumption level significantly exceed those at the high level for tomatoes and citrus fruit, other vegetables and fruit, and meat, poultry, and fish. The results of this comparison are, however, in line with past experience.

It will be observed that total consumption at the \$3,000-\$4,999 income level for milk or its equivalent and leafy green and yellow vegetables are substantially below the good adequate consumption requirements, which points up once again the strong tendency among the people of this country to underconsume these two vital protective foods. On the other hand, at the \$3,000-\$4,999 income level there was an increase in the total consumption of meat, poultry, and fish, other vegetables and fruit, and tomatoes and citrus fruit—all high-resource-using, consequently expensive foods—which are purchased in larger quantities as consumer incomes rise. Hence, total requirements for these foods would naturally increase, under a situation wherein all persons consume at the \$3,000-\$4,999 income level.

If cost were not a consideration, total food requirements at the \$3,000-\$4,999 income level might serve as a measure of high-level food consumption since those requirements are not seriously deficient. However, total food requirements, given a situation of good adequate diets as a minimum, are sufficient to provide each individual with a nutritionally adequate diet that is in keeping with the national tastes and customs and that offers a less expensive diet to people in low-income groups. Thus, keeping in mind that a set of programs may be developed under which the high level of consumption may be achieved, the measure defined by good adequate diets as a minimum appears most useful. It is not likely that all persons will ever consume in the manner of the most fortunate, but it is imperative to the Nation's best welfare that all persons receive a health-sustaining diet.

Total food requirements at the defined high level of food consumption are compared in table 10 with total requirements in a full-employment situation¹⁷ as of 1950. Total requirements in these two situations represent the different quantities of food which might be expected to move into consumption if either situation were realized. It will be observed that requirements at the high level of food consumption exceed those in the full employment situation in five food groups, the most significant of which are (1) milk or its equivalent and (2) leafy green and yellow vegetables, whereas total requirements in the full-employment situation exceed those with good adequate diets as a minimum in six food groups, the most significant of which are (1) tomatoes and citrus fruit and (2) flour and cereals. But with

¹⁷ Based on estimates of average per capita consumption as of 1950 under conditions of full employment. See *WHAT PEACE CAN MEAN TO AMERICAN FARMERS. POST-WAR AGRICULTURE AND EMPLOYMENT* (21).

TABLE 10.—*A comparison of total food requirements at the high level of consumption with requirements under full employment in the United States (assumed conditions for year 1950)*

Food groups	High-level	Full-	Discrepancy
	consumption	employment	
Milk or its equivalent ²	Mil lb ²	Mil lb ²	Mil lb ²
Potatoes and sweetpotatoes	100,178.1	79,776.0	+20,402.1
Dry beans and peas, and nuts	20,079.8	17,640.0	+2,439.8
Tomatoes and citrus fruit	2,332.1	42,620.0	-257.9
Leafy green and yellow vegetables	16,225.6	22,500.0	-6,274.4
Other vegetables and fruit	22,750.6	14,800.0	+7,950.6
Eggs	35,335.9	35,000.0	+335.9
Meat, poultry, and fish	5,803.3	6,014.0	-210.7
Flour and cereals (baked goods equivalent)	22,056.9	52,266.0	+390.9
Butter and other fats	28,514.3	30,000.0	-1,485.7
Sugar and other sweets	10,108.2	10,757.0	-648.8
	17,591.3	18,288.0	-696.7

¹ Based upon estimates of average per capita consumption as of the year 1950 under conditions of full employment from *What Peace Can Mean to American Farmers, Post-War Agriculture and Employment* (21).

² Retail weights.

³ Milk equivalents were computed on a fat-solids basis for the full-employment situation and on a protein-equivalent basis for the good adequate diet. With the disposition of whole milk between products as assumed here the two different conversion procedures yield the same aggregate equivalent quantities, hence the comparison is a true one.

⁴ Includes 287 million pounds of tree nuts not included in Bureau of Agricultural Economics series of compiled statistics.

⁵ Includes 1,170 million pounds of offals not included in Bureau of Agricultural Economics series of compiled statistics.

the exception of tomatoes and citrus fruit, total requirements in the full-employment situation do not greatly exceed those at the defined high level for any food group.

The comparison between probable actual and high-level food-consumption requirements is modified greatly by moving from the base level to the full-employment situation (tables 8 and 10). The tables show that the serious underconsumption of milk or its equivalent in the aggregate at the base level is alleviated somewhat in the full-employment situation, and the deficit for tomatoes and citrus fruit is converted into a striking excess. Smaller but beneficial increases in aggregate consumption, with a rise in the level of economic activity, are indicated for leafy green and yellow vegetables, other vegetables and fruit, eggs, and meat, poultry, and fish. In only one food group, potatoes and sweetpotatoes, does the trend in aggregate consumption run counter to total requirements at the defined high level of consumption with a rise in the level of economic activity. On balance then the directional shifts in total food requirements with upward movements in the net national income appear to be correctly oriented.

From these comparisons of total food requirements certain relationships concerning aggregate food consumption are evident. First, the quantities of milk or its equivalent and leafy green and yellow vegetables required to satisfy the condition of good adequate diets as a minimum for all persons in the United States as of the year 1950 clearly and substantially exceed total requirements at (1) the base level of consumption, (2) if all persons consumed at the \$3,000-\$4,999 income level, and (3) in the full-employment situation. Second, a comparison of income situations more favorable than that

indicated for the base level, whether measured in terms of all persons consuming at the \$3,000-\$4,999 income level or in terms of a full-employment situation, increases total requirements for all food groups that are seriously deficient in the base level-high level comparison.

INCOME EFFECTS TO THE NATIONAL ECONOMY

Achieving the high level of food consumption over the base level would have significant implications to the operating economy.¹⁸ In terms of the 1941 price level, consumer expenditures approximating 3.4 billion dollars would be required to provide the additional quantities of food necessary to assure good adequate diets as a minimum.¹⁹ In other words, achieving the high level of food consumption would necessitate consumer expenditures of 3.4 billion dollars over and above the total volume of expenditures at the base level for the year 1950 estimated to be 20.9 billion dollars. Of the total increase in food expenditures 2.15 billion dollars would probably be spent for milk or its equivalent, 666 million dollars for leafy green and yellow vegetables, 266 million dollars for meat, poultry, and fish, 207 million dollars for tomatoes and citrus fruit, 84 million dollars for other vegetables and fruit, 54 million dollars for eggs, and 15 million dollars for potatoes and sweetpotatoes.

The magnitude of the total increase in food expenditures would vary inversely, of course, with the level of actual consumption, which in this case is defined as the base level. At higher levels of net national income—above 105 billion dollars—the supplemental food expenditures required to achieve the high level of food consumption would necessarily fall, since a greater volume of expenditures for food would be made by consumers from their enhanced incomes. The 3.4 billion dollars of additional food expenditures, therefore, is a measure in a particular situation and would vary inversely with the level of economic activity. Given the base-level situation of 1950, the realization of the high level over the base level would increase total food expenditures from 20.9 billion dollars to 24.3 billion. And assuming that a like amount of expenditures was not curtailed in other lines of consumer goods, aggregate expenditures would be increased by 3.4 billion dollars. This increase would, in turn, provide an impetus to raise the net national income above the level of 105 billion dollars.²⁰

¹⁸ It is recognized that the high level of food consumption could not be achieved instantaneously, for lack of knowledge is an important cause of underconsumption, but an instantaneous achievement is assumed here for purposes of estimating income effects.

¹⁹ Estimated from food-expenditure data for 1941 in *The National Food Situation*, July 1942, (see footnote 8, p. 8), and other unpublished material basic to the published estimates. Service charges on meals taken away from home are not included, and values were imputed to home-grown food.

²⁰ How much the net national income would be raised by the initial expenditure of 3.4 billion dollars would depend upon the income-velocity of the money introduced into the income stream via food expenditures as of 1950. For example, if the income-velocity for the marginal increment of expenditure, in this case 3.4 billion dollars of food expenditures, were 3 as of 1950, then the net national income would be increased 10.2 billion dollars. But the income-velocity of this marginal increment of food expenditure is not known. Therefore, the most that can be said is that the net national income would be raised by some amount greater than 3.4 billion dollars if aggregate expenditures were increased by 3.4 billion dollars. See Angell, J. W. (2, ch 9) for a full discussion of the income-velocity of money.

At a level of economic activity approaching full employment as of 1950, the additional expenditures that would be required to realize the high level of food consumption would be less than the 3.4 billion dollars in 1941 prices. In a full-employment situation, "normal" food expenditures—hence consumption—would tend to increase thus narrowing the discrepancy between the actual level and the high level of consumption. How much it would be narrowed would depend upon (1) the distribution of income in the improved economic situation and (2) the extent to which underconsumption may be caused from lack of knowledge; but it would be narrowed. Thus, the effectiveness of food consumption-adjustment programs designed to further increase aggregate consumption once a full-employment situation had been reached, assuming increased aggregate expenditures were needed to offset aggregate savings, would be limited.

In other words, achieving the high level of food consumption in any economic situation less than one characterized by full employment would contribute appreciably to the attainment of full employment. But total food requirements in a full-employment situation as of the year 1950 tend to approach or exceed total requirements with good adequate diets as a minimum in all food groups, except milk or its equivalent, leafy green and yellow vegetables, and potatoes and sweet-potatoes; hence, achieving the high level of food consumption in the full-employment situation would probably not increase aggregate expenditures over 1.9 billion dollars in 1941 prices.

But if reduced levels of economic activity develop in the postwar years, and consumer units are heavily concentrated in the lower income brackets, the possibility of increasing aggregate consumption by increasing individual food consumption would merit serious consideration. In a deep depression, for example, actual food consumption, hence total requirements, would fall below those at the base level and the discrepancy between the actual and high-level consumption in terms of food expenditures would increase above the 3.4 billion dollars (1941 prices).

Increasing aggregate consumption as a means of raising the level of economic activity could with justification be effected by increasing food consumption in such depressed periods, for the dietaries of broad segments of the population would be below the minimum nutritional standard recommended by the National Research Council. Furthermore, the magnitude of increases in food expenditures needed to achieve the high level of food consumption would be such as to make a significant contribution to economic recovery. Thus, it would seem that achieving a high level of food consumption would have a significant effect in increasing national income at low levels of economic activity, but the effects would become less and less significant as an *initiating force* as the economy approached a full-employment situation.

TO AGRICULTURE

It has been estimated that an increase in consumer expenditures amounting to 3.4 billion dollars, 1941 prices, would be required to achieve the high level of food consumption over and above the base level. What part of those expenditures would probably reach farmer-producers?

The answer to that question turns largely upon the assumption made regarding the flexibility of food supplies. If it is argued that supplies are fixed, then the entire amount of the supplemental expenditure—3.4 billion dollars—would be passed back to the producers of the respective food items in the form of higher prices (*6, p. 5*). In fact, aggregate expenditures would probably rise above 3.4 billion dollars as certain consumers increased their expenditures to bid food items away from other consumers, and in that way forced all consumers to pay higher prices for food items purchased. But this general argument is incompatible with the concept that food consumption itself is increased. Achieving the high level of food consumption would necessitate an increase in the actual quantities of food consumed, hence quantities supplied, regardless of the volumes of expenditures made for food.

But certainly food output does not remain fixed over several seasons. In that period of time producers could and would adjust their farm operations to the new demand situation. And since agriculture has exhibited a chronic tendency toward excess capacity in peacetime, expansionary adjustments should not prove difficult to effect. Further, it seems unrealistic to assume that food supplies are or would be inflexible even in the short run, given a situation in which programs were placed in operation to achieve the high level of food consumption. There are at least two reasons for flexible supplies even in the short run: (1) Food supplies would no doubt be stored on farms and in warehouses in excess of anticipated current requirements before consumption-adjustment programs were placed in effect and (2) considerable produce is wasted or not harvested on farms when prices are depressed, which makes for considerable flexibility of supplies in poor years.

It is assumed in this analysis that the output of food is not fixed through time but, on the contrary, is perfectly elastic, making for constant prices. In estimating the income effects to agriculture from increased consumer expenditures of 3.4 billion dollars marketing costs are deducted from the increased supply moved into consumption as prices remain constant. Such an assumption is limiting, for it may be anticipated that in practice some or all prices would advance. And insofar as food prices increased, the income effects to agriculture would be greater than those flowing directly from the expenditure of an additional 3.4 billion dollars, since all consumers would be forced to increase their food expenditures as prices rose. Hence, the estimated income returns to farmers set forth here represent only direct returns, and for that reason probably represent the minimum income effects of achieving a high level of food consumption.

It is impossible to make precise estimates of the farmer's share of the 3.4 billion dollars of additional expenditures that consumers would make for food under the assumed conditions for 1950, since marketing costs vary considerably for the different food items combined in the 11 food groups. But some rough estimates may be attempted on the basis of handling margins in 1941. Of the additional food expenditures, 44 percent or 1.5 billion dollars would flow directly back to farmers, if the expenditures were spread evenly over all food items. But such is not the case. Additional consumer expenditures of 2.15

billion are anticipated for milk or its equivalent; and of that amount 51 percent or 1.1 billion dollars would flow directly back to dairy farmers. Increased expenditures for all fruit and vegetables would approximate 957 million dollars. Of that amount, 40 percent or 383 million dollars might be expected to flow directly back to producers. And of the increased expenditures for meats, 266 million dollars, it may be anticipated that 160 million would flow directly back to farmers. To these estimates may be added 34 million dollars for eggs and 5 million dollars for potatoes as the producers' share of the increased consumer expenditures. Thus, a total of 1.7 billion dollars is derived as an approximation of the farmers' direct share in the supplemental expenditures for food.

This additional return to farmers of 1.7 billion dollars represents a 13-percent increase in gross farm income from the 1941 base of 13.25 billion dollars. In brief, if food consumption were increased from the base level to the high level (and the base level is comparable except for population increases to the situation in 1941) the aggregate gross farm income would increase by 13 percent. All farmers would not share equally in this increase. For example, dairy farmers would receive an additional 1.1 billion dollar gross income, whereas producers of cereals would not experience any direct increase in gross farm income. It is logical to assume, however, that the direct benefits to one producer group, say to dairy farmers, would be disseminated throughout the agricultural segment of the economy in the form of higher feed prices, a stronger labor market, a demand for more dairy cattle, etc. Thus it would appear that farmers generally would benefit significantly from the realization of good adequate diets as a minimum for all persons in the United States.

THE CONSUMPTION-PRODUCTION BALANCE

What is needed to ascertain the food consumption-production balance is a measure of food output at agriculture's optimum capacity to produce. But agriculture's capacity to produce is not fixed or absolute. In a free economy, characterized by many small and independent units, as is the case in agriculture, there can be no absolute physical measure of productive capacity, but only an optimum measure relative to an existing and anticipated set of price relationships wherein each factor of production is so employed that a shift in employment would reduce the return to that factor.

Thus, the capacity to produce varies according to the use made of resources in different productive combinations, and the way those resources are combined in production is determined by the effective price relationships. Specifically then, agriculture's capacity to produce at any particular time is dependent upon (1) the relationship between the agricultural price level and the level of prices in other industries and trades related in the circular flow of income and (2) the pattern of prices existing within agriculture as between different commodities. Therefore, it is impossible to derive a measure of agriculture's optimum capacity to produce by some absolute standard as was used to determine the high level of food consumption, when in fact production is motivated by the income incentive. A level and pattern of output relative to some set of price relationships must be used.

FOOD OUTPUT IN 1943

Total food requirements at the high level of food consumption may then be compared with food output in some historical period or with food output under some anticipated set of price relationships. In this analysis the pattern of food output under the price and income relationships of 1943 is used as a base from which to make comparisons with total food requirements.

The 1943 production base was selected for two principal reasons: (1) It is representative of a full-employment situation in which the factors of production were, in practice, utilized as completely as possible and probably in the most advantageous combinations relative to the price structure and (2) it is representative of the wartime production pattern from which agriculture must move and adjust to meet peacetime demands.

The 1943 production pattern and volume of food output make up the raw data, hence they constitute the point of departure, in reorganizing agriculture to produce the kinds and quantities of food that will be required in the postwar years. By comparing total food requirements as of 1950 at high and base levels of consumption with the 1943 food-production pattern, it is possible to get an indication of the direction or directions in which agricultural production must shift and the extent to which excess capacity may or may not exist in the postwar years.

But only a part of the production in 1943²¹ would be converted into food available for human consumption. Excluding fiber production, certain requirements for feed and seed had to be met to maintain the agricultural plant. Substantial deductions necessary in the conversion of farm produce into food were also taken into account; for example, waste and spoilage in the distributive system, and physical losses in processing. In addition, domestic requirements for products other than food, especially alcohol in 1943, were met from total farm production.

The net output of food combined by food groups resulting from the high level of agricultural production in 1943 is indicated in table 11.²² The quantities listed in table 11 represent the actual pounds of food available for consumer purchases. The numerous farm products were converted and combined into the 11 food groups for ease in making comparisons with food requirements at different levels of consumption. With this information food requirements at different levels of consumption may be compared with domestic food output to ascertain the consumption-production balance.

OUTPUT AND REQUIREMENTS

The extent to which total food output in 1943 would be offset by consumption as of 1950 may now be measured under two sets of conditions: (1) High-level consumption represented by good adequate diets as a minimum plus 1935-39 average food exports and shipments from the United States and (2) base-level consumption plus 1935-39 average food exports and shipments from the United States. In table 12 total food requirements, domestic and foreign, at the base

²¹ Refer to table 19 for agricultural-production data for 1943 with 1935-39 comparisons.

²² Imports as food or raw produce converted into food are not included, since the measure desired is that of total domestic food output.

TABLE 11.—*Total output of food in the United States, 1943*

Food groups	Food output
Milk or its equivalent ²	74,746.4
Potatoes and sweetpotatoes	21,822.0
Dry beans and peas, and nuts	4,506.7
Tomatoes ³ and citrus fruit	20,141.3
Leafy green and yellow vegetables ³	13,623.3
Other vegetables and fruit ³	30,208.8
Eggs	6,857.3
Meat, ⁴ poultry, and fish	23,148.7
Flour and cereals (baked goods equivalent)	34,058.7
Butter and other fats ⁵	11,874.5
Sugar and other sweets	5,176.3

¹ Retail weights.² Milk supplies used in butter production not included.³ Includes estimates for market gardens and farm production for home use.⁴ Bacon and salt side not included.⁵ Includes bacon and salt side.TABLE 12.—*A comparison of total food output in 1943 with total food requirements, domestic and foreign, at the base level of domestic consumption*

Food groups	1943 food output	Food requirements		Balance
		Domestic, base level	Foreign 1935-39, average	
Milk or its equivalent	74,746.4	68,770.1	213.2	5,763.1
Potatoes and sweetpotatoes	21,822.0	19,275.2	202.3	2,344.5
Dry beans and peas, and nuts	4,506.7	2,332.1	99.1	2,075.5
Tomatoes and citrus fruit	20,141.3	13,112.0	621.4	6,407.9
Leafy green and yellow vegetables	13,623.3	12,722.4	³ 35.4	865.5
Other vegetables and fruit	30,208.8	33,921.9	³ 1,531.5	-5,249.6
Eggs	6,857.3	5,497.8	3.3	1,356.2
Meat, poultry, and fish	23,148.7	21,628.4	156.5	1,363.8
Flour and cereals (baked goods equivalent)	431,877.3	28,514.3		3,363.0
Butter and other fats	11,874.5	10,108.2	267.9	1,498.4
Sugar and other sweets	5,176.3	17,591.3	414.6	-12,829.6

¹ United States Bureau of Agricultural Economics THE NATIONAL FOOD SITUATION. NFS-6, 29 pp., illus. 1943.

² Retail weights.³ Only principal exports included.

⁴ The average quantities of grains exported in 1935-39 were deducted from the total quantities of raw produce converted into food, since it is impossible to know what utilization is made of grain exported as grain.

level of domestic consumption, are compared with the total output of food in 1943. It is evident that total food output in 1943 would on balance be heavily in excess of total requirements at the base level of consumption. Total output exceeds total requirements in 9 of the 11 food groups, the exceptions being other vegetables and fruit and sugar and other sweets.

In the case of other vegetables and fruit the production of fresh deciduous fruit was materially reduced in 1943 by adverse weather conditions. Thus the deficit indicated for that food group might be expected on the average to be reduced by 2 to 3 billion pounds. In the case of sugar and other sweets there is no chance that domestic requirements could be met through increased production within the United States. Nor should there be, for ordinarily sugar requirements are

filled by imports and by inshipments from the territories. Sugar is the one major food group in which domestic production may not be expected to supply total requirements under any reasonable set of conditions; hence this deficit is without particular significance in the consumption-production balance. Therefore, it may be concluded that food supplies would accumulate in surplus stocks or run to waste in tremendous quantities if (1) the level of food output achieved in 1943 is maintained and (2) aggregate food consumption is not sustained above the base level.

TABLE 13.—A comparison of total food output in 1943 with total food requirements, domestic and foreign, at the high level of domestic consumption

Food groups	1943 food output	Food requirements		Balance
		Domestic, high level	Foreign, 1935-39 average ¹	
		<i>Mil lb²</i>	<i>Mil lb²</i>	<i>Mil lb²</i>
Milk or its equivalent	74,746.4	100,178.1	213.2	-25,644.9
Potatoes and sweetpotatoes	21,822.0	20,079.8	202.3	1,539.9
Dry beans and peas, and nuts	4,506.7	2,332.1	99.1	2,075.5
Tomatoes and citrus fruit	20,141.3	16,225.6	621.4	3,294.3
Leafy green and yellow vegetables	13,623.8	22,750.6	³ 35.4	-9,162.7
Other vegetables and fruit	30,203.8	35,335.9	³ 1,531.5	-6,663.6
Eggs	6,857.3	5,803.3	3.3	1,050.7
Meat, poultry, and fish	23,148.7	22,656.9	156.5	335.3
Flour and cereals (baked goods equivalent)	⁴ 31,877.3	28,514.3	—	3,363.0
Butter and other fats	11,874.5	10,108.2	267.9	1,498.4
Sugar and other sweets	5,176.3	17,591.3	414.6	-12,829.6

¹ See footnote 1, Table 12, p. 27.

² Retail weights.

³ Only principal exports included.

⁴ The average quantities of grains exported in 1935-39 were deducted from the total quantities of raw produce converted into food since it is impossible to know what utilization is made of grain exported as grain.

Achieving the high level of food consumption over the base level would ease the over-all surplus problem, but it would not eliminate the need for production adjustments (table 13). Relative to the pattern and level of food output in 1943, total requirements, domestic and foreign, at the high level of domestic consumption are sufficiently large to eliminate the general surplus condition indicated at the base level, but output and requirements by food groups fail to match with any reasonable degree of tolerance. Moving from the base level to the high level of consumption the surplus for milk or its equivalent of 5.8 billion pounds is converted into a deficit of 25.6 billion pounds and the surplus in leafy green and yellow vegetables of 0.9 billion pounds to a deficit of 9.2 billion pounds. On the other hand, surpluses sufficient in magnitude to demoralize the market critically continue to evidence themselves in six food groups: Potatoes and sweetpotatoes; dry beans and peas, and nuts; tomatoes and citrus fruit; eggs; flour and cereals; and butter and other fats.

If the high level of food consumption were achieved it would make the problem of food surpluses less acute and perhaps bring it into manageable proportions. However, the problem of production adjustments within agriculture would not be alleviated; for if the high level

of food consumption should become a reality in the postwar years, the pattern of food output in 1943 would have to adjust to the relatively high requirements for milk or its equivalent and leafy green and yellow vegetables, and to the lower requirements for the less expensive energy-producing foods.

If a higher level of food exports than the 1935-39 average had been used as a measure of foreign requirements, some part or perhaps all of the surpluses indicated in table 13 could have been eliminated. It may be argued in the light of the declared objective of the United Nations Conference on Food and Agriculture (22, pp. 11-31), namely, to achieve freedom from want—hunger and malnutrition—on a world basis, that all food supplies over those required domestically should be considered a part of foreign requirements, especially since foreign food requirements are infinitely vast if measured in terms of nutritional needs. Such a manipulation would be an easy way to dispose of food surpluses on paper, but the conventional means of trade and payments blocks this avenue of surplus disposal. It is possible, in the long-run postwar period, that trade agreements may be formulated which will be based on the food-consumption needs of one nation and the export needs of another. But for the purpose of this analysis foreign requirements have been measured in terms of the most recent prewar experience—the volume of food exports for the period 1935-39²³ (fig. 4).

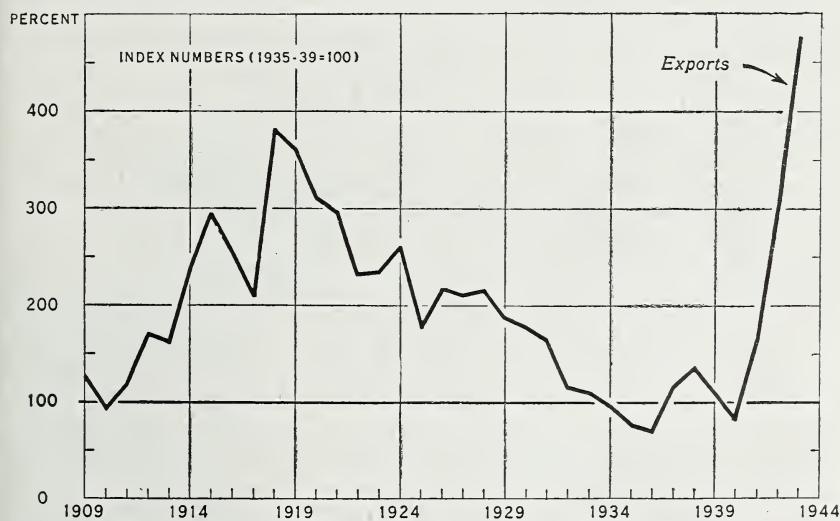


FIGURE 4.—Volume of food exports, United States, 1909-43

If, on the other hand, the current efforts of the United Nations to build an international structure relatively free of autarky and restrictions are successful, the volume or level of food exports may soar above the 1935-39 average, and completely eliminate the problem of domestic

²³ The reader is free, of course, to use any export quantities he has reason to believe may be realized. The 1935-39 average certainly does not represent a forecast by the writer, but is simply an average of food exports for the 5-year period preceding the war.

surpluses. Certainly the expansion of food exports on a multilateral basis provides the most hopeful and logical avenue of surplus disposal after underconsumption has been eradicated in the United States.

But agriculture's capacity to produce cannot be considered as static—or likely to remain stationary at the 1943 level. The capacity of the national agricultural plant to expand and develop in the postwar years is tremendous. In an address before the 1944 Agricultural Outlook Conference, Sherman E. Johnson made the following statement:

In analyzing post-war potentialities it would be unrealistic to think of going back to pre-war patterns and levels of production. Many of the wartime changes are irreversible and will persist, and perhaps even be accentuated under peace-time conditions. Both agriculture and other industries have gone through a production revolution during the war and it is unlikely that agriculture will go back to the comparative "handicraft" basis of the pre-war years.²¹

If the past can be used as a guide to the future, total agricultural production will continue to increase at a rate of 1 to 2 percent per year (fig. 5). The rate of increase in total agricultural output has

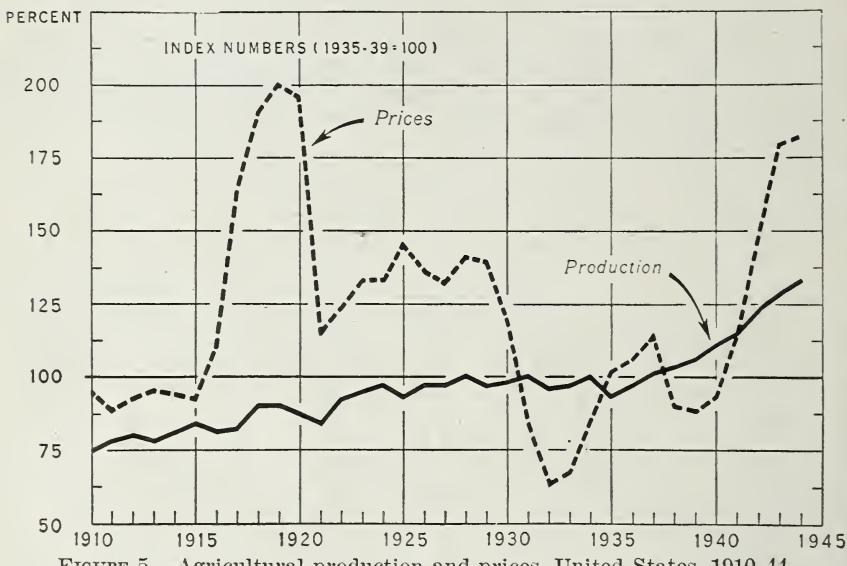


FIGURE 5.—Agricultural production and prices, United States, 1910-44

fluctuated markedly from year to year, and as between different agricultural commodities, increases in productivity and output have been rather uneven; (3, pp. 325-352) but it is safe to assume that agriculture's over-all capacity to produce will be substantially greater in 1950 than it was in 1943. On a per capita basis, food production has made comparable gains, for during the 34-year period, 1910-43, the index of per capita production has moved up from 106 to 125. (25, p. 13) It is this record of agriculture's increasing capacity to produce that prompted this analysis—to discover ways and means of moving that increased output into consumption.

²¹ JOHNSON, S. E. PRODUCTION ADJUSTMENTS—1945 AND POST-WAR. Address . . . at 22nd Annual Agricultural Outlook Conference, Washington, D. C., November 14, 1944. U. S. Bur. Agr. Econ. 36 pp., illus. 1944. [Processed.] (See p. 6.)

The problem of productive capacity relative to food requirements thus logically divides itself into two aspects: (1) the over-all capacity—the capacity of the national agricultural plant to supply total requirements—and (2) the capacity of different segments of the agricultural plant in a given period with a given production pattern to supply the quantities of food required, food group by food group.

With respect to the long-run postwar period, the problem of over-all productive capacity in agriculture, or perhaps more accurately stated, excess capacity, is heavily weighted with imponderables. If the high level of food consumption defined by good adequate diets as a minimum is realized in the postwar years, a significant portion of the agricultural plant which otherwise might be defined as excess capacity would be utilized to meet the increased domestic food requirements. If, further, international collaboration of the type envisaged at the United Nations Conference on Food and Agriculture is achieved, all of the productive capacity of the national agricultural plant in excess of that devoted to satisfying domestic needs will be required to produce food for export, destined in large part for the underprivileged peoples of the world.

On the other hand, agriculture's over-all capacity to produce will outrun consumption requirements and the national agricultural plant will be plagued with excess capacity, surplus supplies, and a persistent downward pressure on prices if (1) the high level of food consumption is not realized, (2) the high plane of collaboration envisaged and set forth in the declarations of the United Nations at the Hot Springs Conference is not achieved, and (3) technological innovations continue to pour forth at the accelerated rate at which they have in recent years.²⁵

The second aspect of the problem of productive capacity relative to food requirements is that of too great capacity in one type or group of commodities and too little capacity in another—or the failure of output by food groups to conform to demand requirements. If it may be assumed that over-all plant capacity is approximately equal to over-all requirements, the problem is reduced to the practical level of how to effect shifts in production to meet the given requirements.

This is somewhat the situation portrayed in the comparison of 1943 food output with total food requirements, domestic and foreign, at a high level of domestic consumption. To achieve the high level of food consumption given the 1943 productive base, the output of milk or its equivalent would have to be increased by 35 percent, the output of leafy green and yellow vegetables by 67 percent, and the output of other vegetables and fruit by 22 percent; whereas the output of dry beans and peas, and nuts would have to be reduced by 46 percent, tomatoes and citrus fruit by 16 percent, eggs by 15 percent, and butter and other fats by 13 percent (based on indices indicated in table 14).

The magnitude of these excesses and deficits in productive capacity by food groups indicates the direction and the intensity of shifts in production that will need to be forthcoming if the high level of food

²⁵ These conclusions are in substantial agreement with the statements prepared by B. W. ALLIN, AGRICULTURE AND FULL EMPLOYMENT; and S. E. JOHNSON, IMPROVEMENTS IN FARM TECHNOLOGY AND THEIR EFFECTS ON FARM OUTPUT. In *Statements from the Department of Agriculture Interbureau Committee on Post-War Programs Submitted to the House Special Committee on Economic Policy and Planning*. Aug. 23, 1944. 45 pp. Washington. 1944. [Processed.] (See pp. 1-3 and 4-7.)

TABLE 14.—*Food output by food groups in 1943 when total food requirements, domestic and foreign = 100*

Food groups	Index of production capacity at—	
	The base level of consumption	The high level of consumption
Milk or its equivalent	108	74
Potatoes and sweetpotatoes	112	108
Dry beans and peas, and nuts	185	185
Tomatoes and citrus fruit	147	120
Leafy green and yellow vegetables	107	60
Other vegetables and fruit	85	82
Eggs	125	118
Meat, poultry, and fish	106	101
Flour and cereals (baked goods equivalent)	112	112
Butter and other fats	114	114
Sugar and other sweets	29	29

consumption is to be realized by 1950. It is impossible to state whether the realization of these shifts in output (certain of them increases and certain of them decreases) would exactly balance out so that the size of the agricultural plant—number of acres cropped—in 1943 would remain unchanged through 1950. Improved farm practices, new strains and varieties, specific food items demanded, and the extent of geographical shifts required—all unknown variables—will determine the size and pattern of the adjusted agricultural plant.

But the immediate objective, the consumption-production balance, has been ascertained. It provides (1) directional guides for adjusting agricultural production and (2) rough measures of the extent and intensity of the production shifts required, if the high level of food consumption is to be achieved.

ACHIEVING HIGH-LEVEL CONSUMPTION

PROBLEMS OF UNDERCONSUMPTION

The underconsumption of food at the base level was found to take two different but related forms: (1) General undernourishment and (2) protective-food deficiencies. Thus, the development of programs intended to combat the underconsumption of food must necessarily vary in design according to the forms involved. Undernourishment directly associated with low and inadequate incomes will be eliminated as a social evil only when the basic cause—insufficient income—is eliminated. Hence, a supplemental-income or purchasing-power approach to assist consumer units to increase their purchases of food would appear to be an indispensable part of a national program designed to combat the underconsumption of food. Deficiencies in protective foods, on the other hand, because they are common to all income groups, can probably best be reached through a broad educational approach; for limitations in income are certainly not a cause of food deficiencies in the middle and upper income classes. Indifference and ignorance must be combated universally.

These two basic approaches to the problems of underconsumption may be materially strengthened by a third or service approach. The

provision of new and the improvement in old food-handling facilities is an effective and accepted means of combating the underconsumption of food.

Programs falling within these three approaches will not eliminate all types of malnutrition in the United States—especially those resulting from inadequate scientific knowledge and destructive food preparation—but they will go far toward reducing those which stem from the underconsumption of food.

But the question may be asked, "Will low-income people who suffer from undernourishment increase their food consumption as their incomes are increased by one device or another?" Milo Perkins, when President of the Federal Surplus Commodities Corporation, in February 1940 gave one answer to this question in a paper before the Fourth Annual Farm Institute (12, pp. 6, 15), as follows:

What is this potential low-income market like? Evidently these underprivileged people can and will spend more money for food if they have an opportunity. Does this mean that they pay higher prices for better food, or do they actually seek more food? The answer is they do both. We know that low-income people are eating about half as much as they want. They will buy more food and greater varieties of it, if they have the opportunity. There are calory as well as vitamin deficiencies in the diets of our less-fortunate families.

Mr. Perkins substantiated these statements by showing certain results of the Stamp Plan then in operation.

The Stamp Plan (see p. 37) began in Des Moines on August 23, 1939. In the 12 weeks which followed there was a business pick-up in the food trades amounting to 5 percent as compared with sales in the 6-week period before the program started. Sales in stores in low-income areas²⁶ of the city, however, where most of the surplus blue stamps are used, increased by 16 percent the first 12 weeks of the program. . . .

A more precise procedure may be used for measuring increases in consumption with increases in incomes from static income-consumption patterns, if it can be assumed that individuals of one income class will behave essentially like individuals in the next higher income class, when increases in income raise them to the next higher income class. The ratio of the rate of change in the consumption of a product to the rate of change in income is defined as the income elasticity of that product. For example, if the quantity of the commodity consumed remains the same with a rise in income, its income elasticity is zero; if the quantity of the product consumed increases with a rise in income, its elasticity is positive; and if the quantity consumed increases at the same rate as income, its income elasticity is one. In certain cases the consumption of a commodity may actually decrease with a rise in income. Conversely, the rate of increase in consumption of a commodity may be greater than the rate of increase in income, as in the case of certain luxuries.²⁶

Total expenditures for food for all families and single individuals are plotted against income as of 1941 in figure 6. (7, pp. 16-18) The points fall in a smooth curve on the double logarithmic paper. The curve is rather elastic at low levels of income and is progressively less so at higher levels of income. The income elasticity for total food expenditures approximates 1.06 for the income range \$545-\$994, and falls to an approximate 0.54 for the income range \$3,979-\$11,941.

²⁶ See Allen and Bowley (1) for pioneer work with this technique, and Staehle (18) for more advanced work with particular commodities.

To express the idea differently, a given rate of increase in income in the range \$545-\$994 is accompanied by a rate of increase in total food expenditures relative to that of income almost double that in the income range \$3,979-\$11,941. For example, a family with an annual income of \$600 which spends \$300 for food, if it has an income increase of \$60 will spend about \$30 of the increase for food, a ratio of the rates of increase approximating one to one; whereas a family with an annual income of \$6,000 which spends \$1,000 for food, if it has an income increase of \$60 a year will spend only \$5 of the increase on food or a ratio of the rates of increase approximating one to two.

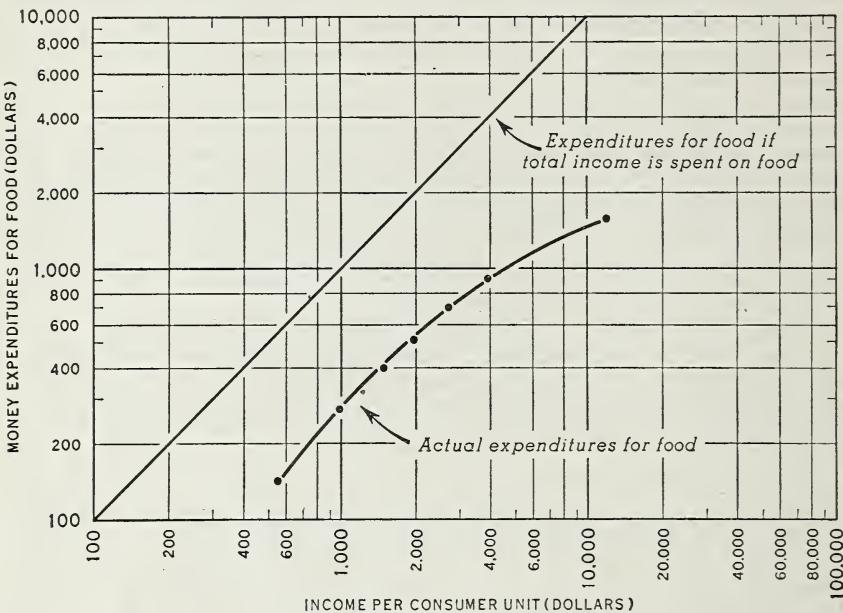


FIGURE 6.—Total expenditure for food related to income, all family and single consumer units, United States, 1941

Although it is impossible to state with exactitude the volume of increased food consumption that will accompany a given increase in consumer incomes, all available data show that total food expenditures and total food consumption do increase with increases in income. Further, the proportion of any increase in income expended on food is greater at low levels of income than at high levels. Thus, it appears that augmenting the purchasing power of low-income people is one certain way of reducing the underconsumption of food.

To cope effectively with the problem of deficiencies in protective foods a second approach, an education approach, seems necessary. As Joseph S. Davis aptly states the problem: "Between the body's *need for nutrients* and the consumer's *wants for food* there is a gap in understanding that needs to be bridged." (5, p. 7) It has been shown that deficiencies in protective foods pervade the upper income groups, where income restrictions are inoperative, as well as the low-income groups.

This can mean only that these more fortunate people are not well-informed or that they are indifferent to good dietary practices. Education would appear to be the basic type of corrective in this problem area.

The service approach to the problem of the underconsumption of food is closely related to the income and educational approach, although the tangible manifestations may appear to be quite different. The lack of food-handling facilities among any class of consumers might be attributed solely to the lack of income, or, if not entirely to limited incomes to ignorance or indifference as well. But even though it is conceivable that a lack of food-handling facilities as a cause of the underconsumption of food could be corrected through the income and educational approaches, it is also true that the basic causes—lack of income and lack of knowledge—could be mitigated by more adequate food services. And in practice it might prove easier to correct the underconsumption of food stemming from limited incomes and ignorance by in-plant feeding programs, school-lunch programs, low-cost frozen food lockers, etc., than by a frontal attack on those twin evils.

INCOME APPROACH

The achievement on the part of society of a full and efficient use of resources, physical and human, is the only long-run solution to the fundamental problem of providing each member of society with an adequate income—an income sufficient to buy the necessities of life—food, clothing, shelter, education, etc. Such a solution implies: (1) A continued increase in the productivity per worker and (2) the opportunity for each responsible member of society to find productive work.

Remunerative jobs for all based on efficient production, then, should be the uncompromising goal of society. But if something short of that goal is realized it may be necessary to aid low-income people to obtain the necessities of life, of which food is the first item. Further, food programs if properly designed would contribute to the achievement of a full use of resources by contributing to the maintenance of aggregate expenditures.

A wide array of special programs designed to increase food consumption have been discussed, experimented with, and placed in operation in the United States and other countries, which fall within the income approach. The basic idea of this approach is simply that when and where food consumption is restricted by inadequate incomes the limiting factor, income, is lifted in some manner. In some instances, food consumption restricted by inadequate incomes is increased through the provision of supplemental purchasing power of a general or specialized type of currency. In other instances, food consumption may be increased by actually providing certain or all types of food.

But the general idea is the same—real income is increased, thus permitting food consumption to increase. Programs falling within the income approach vary from the general to the restricted, and may logically be discussed in that order (14, 16).

A reduction in all or certain food prices to all consumers is probably the least restrictive type of program to be suggested within the income approach. (4) With a blanket reduction in food prices, whether through the use of producer subsidies or some other mechanism, the incomes of consumer units would increase as expenditures for given quantities of food decreased. Hence, those low-income consumer units whose food consumption heretofore had been restricted by inadequate incomes would find themselves in a position to increase their food consumption out of their enhanced incomes.

The advantages of this type program are: (1) No means tests are set up for participation in the program and (2) consumers are permitted to make expenditures from their increased incomes according to their individual choices. The disadvantages seem more serious: (1) As the Government would be subsidizing low-price food to all consumer units, the costs of the program would be excessively large; (2) a large proportion of the enhanced consumer-unit incomes would be directed against items other than foods; and (3) the possibilities for increasing food consumption in lines dictated by nutritional standards would be at a minimum.

One type of program often suggested, especially by social workers, as a means of increasing food consumption among low-income people is to provide those people with a cash grant. The cash-grant idea, as it is most often presented, is that the income of a consumer unit would be supplemented by a cash-grant subsidy which, added to the original income of the consumer unit, would raise the total income of the unit to some predetermined minimum level. The size of the cash grant to a particular consumer unit would thus vary inversely with the income of the unit. And the consumer unit would be free to allocate its income expenditures for goods and services in any way that it saw fit. Hence, under this type of program a participating consumer unit would be free to increase its food consumption in any proportion it wished and by the types of food of its choice.

This type of program enjoys certain advantages in that it is relatively free of administrative complexities and consumers are free to maximize their total satisfactions in any way which to them appears to be most rational. It suffers from another viewpoint in that undesirable food habits or the underconsumption of protective types of foods, stemming from inadequate knowledge, are not corrected or mitigated. Further, the idea of cash grants to raise the total expenditure of a consumer unit to some predetermined minimum level is apparently socially objectionable to many people, since no controls are maintained over consumer choices, and expenditures may be made for goods and services not usually classed as necessities.

But if the social stigma of cash subsidies is overcome, this type of program has great merit as an antideflationary device. In times of depressed economic activity in which incomes were declining consumer-unit expenditures, hence aggregate expenditures, could be maintained at some predetermined level. As incomes of consumer units fell below the previously determined level, these consumers would become eligible to participate in the cash-grant program, hence would receive a subsidy which, added to their original income, would raise their total income to the established level. In this way a floor of guar-

anted expenditures would be placed under the operating economy, and a downward spiral of prices, production, and employment could be stopped.

A more restrictive type of program was experimented with during the late 1930's. It was popularly called the Food Stamp Plan. Blue stamps were issued to low-income participants which they could use to buy "surplus foods" in private retail stores. As a means of guaranteeing that blue-stamp purchases would be made as a net addition to normal food expenditures, participants were required to buy a minimum quantity of orange-colored stamps which could be used to buy any food items. In 1940 the average consumer-unit participant was spending \$1.06 to \$1.29 per person per week to buy orange stamps. In addition, they were receiving free blue stamps equal to 50 percent of the value of the orange stamps bought.

On the basis of this plan, it is estimated that about 25 percent of the blue-stamp subsidy was substituted for regular food purchases and was without effect in increasing the quantity of food consumed. Ignoring the blue- and orange-stamp mechanism, supplemental purchasing power was simply made available to participants in a specialized type of currency on the basis of certain minimum requirements from which participants could buy surplus foods under the Stamp Plan. (6).

The Food Stamp Plan was first placed in operation in May 1939 in the city of Rochester, N. Y. Some 20,000 persons—relief clients, W.P.A. workers, and other individuals receiving public assistance—were declared eligible to participate in this experimental program. Two years later, in May 1941, at the high point of the program, the plan was in operation in 345 areas with a total of 3.9 million consumer participants. With the advent of the war the plan ceased to expand, and as of March 1, 1943, the entire program was terminated. During the period, May 1939–March 1943, the Federal Government issued blue stamps totaling 260 million dollars to low-income participants. Relative to the number of persons in need of this type of assistance and relative to the size of the agricultural surpluses, the Stamp Plan was a small program. But in conjunction with other surplus-disposal programs, the plan helped to alleviate the most serious market surpluses in the specialty crops and to improve the dietaries of low-income people. The operations of the Stamp Plan also indicate that a program designed to increase the expenditures of low-income people directed against food is administratively feasible, a point that was seriously questioned at the inception of the program.

The principal defects of the Food Stamp Plan would appear to be three in number. First, the Stamp Plan was limited in scope—it offered participation to a relatively small number of individuals who were in need of this kind of assistance. Second, the plan was heavily weighted with aspects of surplus-food disposal, hence in its operations it did not always make available to low-income consumers the type of foods they were underconsuming by objective nutritional standards. Third, the program never successfully stopped the substitution of the income supplement for "normal" food expenditures, hence stopped the substitution of part of the income supplement for nonfood items.

Several food-consumption subsidy plans have been advanced during the war period involving the use of food currencies. The Food Allotment Plan is one of the better known. Under the earlier versions of this plan participants would receive supplemental food stamps which, if added to their normal food expenditure, would raise their total food expenditure to some previously determined level. This type of plan has the advantage over the old Stamp Plan in that supplemental purchasing power is made available to participants on the basis of differential incomes and hence on the basis of need. In other words, the lower the participant's income the greater the income supplement, and vice versa. But this general type of plan suffers as did the Stamp Plan, in that the supplemental purchasing power may be rather easily substituted for some part of the normal food expenditure and thus be without effect in increasing food consumption.

From the viewpoint of nutritionists and agriculturalists both of these programs have an advantage over the general price-reduction scheme and the cash-grant idea in that the supplemental expenditure is directed against foods alone, and under certain conditions some of the food stamps may be earmarked for the purchase of particular types of foods. In one situation the earmarking of food stamps might occur to remove food surpluses, and in another to achieve a particular nutritional objective.

More recent versions of the Food Allotment Plan have been further restricted by the provisions that participating consumer units must buy all their foods from a specialized food-currency book. To provide an incentive for low-income consumer units to participate in this type of program, a book of food currency, sufficient in total value to buy the complete diet at some specified nutritional level, would be sold to the participating consumer unit at a discount. The rate of discount most often discussed would equal the difference between the total value of the currency book and the amount consumer units had previously expended for food.

For example, if a consumer unit of four persons purchased food-currency books equal in total value to \$500 per year—sufficient to provide the total bill of goods comprising the adequate diet—and their normal food expenditure had previously been \$400 per year, the rate of discount for this family in purchasing the currency books would be 20 percent off the retail value of the books. In other words the consumer unit would be permitted to purchase food-currency coupons, valued at \$500, for some \$400.

As a means of easing the administrative difficulties of the program it has been suggested that all participating consumer units purchase these food-currency books at a price approximately equal to 40 percent of the income of the participating consumer unit. This rate was suggested after it was found that the average consumer unit in the lower income brackets spends 40 percent of its income to buy food. Hence, 40 percent of the consumer unit's income approximates the normal food expenditure.

Programs of this type have this advantage—the normal food expenditure of participating consumer units is frozen into the purchase price of the food-currency book. Legally then, it becomes impossible to substitute a portion of the income subsidy for the normal food expendi-

iture, although a certain amount of illegal or black market traffic in discounted food stamps may be anticipated. But it may also be anticipated that most of the supplemental purchasing power made available to consumer units under this type of program would be directed against food; hence the consumption of food would tend to increase by the amount of the income subsidy to consumer units.

Certain limitations inherent in these programs should be recognized. (1) The administrative phases could easily become very complex; (2) the consumption of participants is limited to some extent. For example, participants are encouraged to increase their food consumption by means of a subsidy, although their needs may be greater with respect to other items such as housing, fuel, or medicine.

A type of program often suggested is that of providing specific foods to low-income people. This type of program reached its greatest development in the United States in the 1930's under the direct-distribution operations of the Federal Government. The Federal Government bought so-called surplus farm products under various programs and distributed these supplies to relief clients, using food depots strategically located in urban areas. From the standpoint of particular producers this type of program appears highly desirable in that the incentive for production adjustment is reduced, since farm prices are maintained through surplus disposal.

But from the consumer point of view this type of operation has serious limitations in that the preferences of consumers are mostly ignored. In the 1930's consumers simply received specific types of food designated in surplus as a supplement to their real income.

There are certain other disadvantages to a direct-distribution program as it developed in the United States in the 1930's. (1) The program bypassed the regular channels of trade and hence was frowned upon by wholesalers, retailers, and other members of the food trades; (2) the foods supplied to relief-client participants were not necessarily the foods most needed by them to maintain a satisfactory condition of health. In other words, surplus foods often are not the foods of which the participants are in the greatest need.

Of course, it is not inevitable that a program designed to distribute specific foods to participants to increase their consumption must suffer from these latter disadvantages. For example, participants might well receive those foods at depots which have been specified by public health authorities. But even if the kinds of foods distributed were those of the highest nutritional priority the restrictions to consumer choice that are inherent in this type of program, as compared with those of general or specialized currency approach, make it somewhat undesirable. If participating consumer units are near starving, as some were in the United States in the early 1930's, participants in those groups will welcome any foods offered to them. However, that consideration is decidedly different from the considerations that should be taken into account when establishing a long-time food program for the United States.

The most restrictive of all types of food programs falling within the income approach are those that would provide specific foods to particular groups in the low-income classes. A typical example would be the provision of a milk supplement to pregnant or nursing mothers, or to children in families of specific income classes. Such programs

have been introduced and are operating on a national scale in Great Britain. For example, in July 1940 a plan was adopted in Great Britain whereby a pint of milk each was made available to all expectant and nursing mothers and to children under 5, at less than half the market price, or free if the weekly income of the parents fell below 40 shillings, with this minimum increasing by 6 shillings per week for each additional nonearning dependent. (8, pp. 127-128.)

In Sweden, before World War II, it was suggested by the Population Commission that mothers in certain low-income classes should, on a doctor's prescription, be permitted to buy at discount or be given free of charge foods deemed necessary to the health and well-being of their family by the doctor making the diagnosis (10, Ch. 15). This type of program has an advantage in that the food supplement is controlled directly, and the agency administering the program knows exactly which foods are being increased in consumption, and by how much. But it suffers from another point of view, because of this completeness of control, in that the potentialities for wider consumer choice are largely lost. Once a consumer unit makes the decision to participate all food supplements received are prescribed by the administering agency.

All of the program types heretofore described increase food consumption by increasing real income. When the entire array is surveyed it becomes evident that the differences involved are simply those of operational mechanics. But it may be generalized that as these food programs move from the general to the restrictive, two conditions develop: (1) The administration of the programs becomes more complex and (2) consumer preferences are increasingly circumscribed.

If the decision is made to increase the consumption of food among low-income people by increasing their real income, it would seem that the mechanics of any such program should be tested against four criteria: (1) The elimination, as far as possible, of the obvious means test in determining eligibility for participation, (2) the maintenance of free consumer choice, (3) the early realization of nutritionally adequate diets for all persons in the United States, and (4) the maintenance of total demand for food at all times.

EDUCATIONAL APPROACH

Provision of adequate additional purchasing power to low-income people to permit them to buy a nutritionally adequate diet will not guarantee that those individuals will buy and consume the type and quantities of food required in that diet. As was pointed out earlier, typical consumers who have high incomes fail to consume adequate quantities of milk or its equivalent and leafy green and yellow vegetables. Ignorance of and indifference to nutrient requirements are important causes of the underconsumption of those protective foods. When limitations of income no longer restrict food consumption, but the individuals continue to underconsume vital protective foods, education would seem to be the only corrective. The term "education" as used here may be defined not in a narrow sense but broadly to include: (1) Research in the field of food and nutrition; (2) making research discoveries generally known; (3) breaking down misconceptions and undesirable food habits, and (4) molding new food habits.²⁷

²⁷ See the emphasis placed upon research and education by the *National Planning Association* (11).

The educational phases of programs designed primarily to increase food consumption by increasing consumer-unit incomes have been neglected. The more general the income approach—the more nearly consumer units are provided with increased money incomes from which they are free to buy any items they choose—the more indispensable programs of education become. For if low-income consumer units are granted supplemental purchasing power by some mechanism that has no controls attached, some of their increased expenditures may take the form of ostentatious or conspicuous consumption for a time. Therefore, the educational phases of general food programs falling within the income approach could be extremely valuable in suggesting and molding consumption habits to such an extent as to maximize the return, to the consumer unit and to society, from the income subsidy. But as programs involving income subsidies become more and more restricted with respect to consumer choices, the educational phases of those programs become less important.

The basic units around which educational activities in the field of food and nutrition should probably be built are the various divisions of home economics in the State colleges and the Federal Government. These divisions are equipped to conduct basic research, to publish their findings, and to carry home demonstration work to the consumer level. Working mainly with adults and college students, these divisions have made rather slow progress in modifying food-consumption habits; for it is extremely difficult to induce adults to unlearn undesirable food habits and to form in their stead habits that are based more directly on scientific findings. But it should be recognized that these divisions of home economics have pioneered the educational work in foods and nutrition—they have developed that subject field to the point where large segments of the population are now nutritionally conscious. Therefore, it should be expected that in the future as in the past these divisions will carry the main load in disseminating food and nutritional knowledge. It would seem necessary, however, under any broad program of nutritional education to devise procedures which are more effective than anything that has been developed in the past in converting nutritional knowledge into food habits.

Many of the more basic findings concerning the relation of food to health have been and will continue to be made by chemists, the medical profession, and those in closely allied sciences. (15, Chs. 3-7.) Food processors and handlers, too, have made contributions and passed along discoveries to the consumer in the form of new and improved products. Finally, magazines and periodicals of the homemaker type have reached into the household and made common knowledge much of the information and research findings made available by researchers. Thus, any broad program of education designed to help direct the consumption of food along those lines necessary to sustained good health must also rely on (1) the medical profession, (2) food processors and handlers, and (3) private publishing houses.

The area in which nutritional education probably has been the least effective in the past, relative to its potential, is among children. Food habits, the good ones and the bad ones, are formed chiefly during childhood and are likely to be carried through life as fixed modes of behavior. Most children simply assume or adopt the food habits of their parents. Thus, with minor modifications, the food habits of one

generation tend to carry over to another. Hence, it would seem that the time to teach men and women the meaning of good nutrition and to create desirable food habits is during their childhood. In that flexible and formative period children learn easily, since the problem is simply the creation of habits, not the double process of breaking old habits and learning new ones (24).

The forming or molding of health-sustaining food habits among children might well proceed on three distinct levels: (1) Classroom work in grade schools in the field of food and nutrition, (2) assuring complete nutritionally balanced school lunches for all children, and (3) awakening parents to their obligation to provide their children with the kinds of food prerequisite to good health. The classroom work in the field of food and nutrition would serve to point out the relationship of food to health, to present the latest findings of research regarding nutrition, and to demonstrate the nutrient composition of different foods. The school-lunch program would help protect students who are not receiving a health-sustaining diet at home, and it would provide the necessary experience to students in the eating of foods that are basic to sustained good health. In short, students would learn the meaning of good nutrition by participating in it. Finally, parents could set an example for their children by preparing, serving, and eating the foods deemed necessary to good health.

SERVICE APPROACH

The service approach, supplemented by education, is the conventional approach to the problem of the underconsumption of food in the United States. And as this approach is generally accepted, it should be pursued vigorously insofar as it makes a contribution to a solution of that problem. A clear-cut example would be the providing of handling facilities for perishable foods needed in a given locality to complete the diet, the supply of which had been restricted by the lack of handling facilities. But if individuals clearly lack income, the provision of services at cost will not contribute greatly to the increased consumption of needed foods, and it is for this reason that programs which fall within the income approach were adopted almost exclusively in the 1930's.

If necessary services are subsidized to consumers by the Government or if the cost of services are reduced in some way, an income effect obviously occurs, and the adoption of such service programs would contribute to increased food consumption. Thus, the underconsumption of food due to restricted incomes may be corrected by programs of the service type, as well as through the more obvious income approach.

The National School Lunch Program as it has developed in the United States is the most important program falling within the service approach. As a matter of national policy a food supplement has been offered to necessitous students free of charge and to all students at a price below the total cost of the food served. To that extent the program might be classed under the income approach. In many local areas the serving of lunches has contributed to the molding of desirable food habits among children. In this particular the program might be classed under the educational approach. In brief, the school-lunch program is a clear example of a service-type program that contributes to the solution of the food problems arising from both lack of income and lack of knowledge. But it is classed as a service program here

because (1) it does provide service—it offers to students the opportunity to have a lunch at school that is otherwise not available to them, and (2) the great majority of students buy the lunch at a price sufficient to cover all costs over and above the Federal Government's subsidy.

The lunch program promoted by the Surplus Marketing Administration, later the Food Distribution Administration and Office of Distribution, and now the Production and Marketing Administration within the Department of Agriculture has varied through time, and from one area to another, since the Federal Government has worked with and through local school authorities. Education is held in the United States to be a matter of local concern; hence the Department of Agriculture could not develop one detailed program applicable to all schools. It has rather provided incentives for local schools and school systems to participate in the National Program and, at the same time, has set forth certain minimum requirements to be met by the participating schools. Thus the plan of providing lunch or a food supplement in local schools has varied from providing milk alone—the "penny-milk" program—to providing sandwiches and milk, to providing a completely balanced noon meal; and from the plan under which no charge was made to any students to the plan whereby each pupil is charged a price covering the cost of preparation and serving of the lunch.

But in all these situations where the Federal Government has assisted the local schools either by making available surplus foods or an indemnity covering the cost of part of the food served in lunches,²⁸ the Federal Government has made certain that low-income pupils in need of a noon meal or food supplement, offered by the school, have received that lunch or food supplement free of charge. Also, the Federal agency has made certain that participating schools have not made a profit on their lunch operation and hence have served lunches to all paying students at cost. But even though the Federal Government has financed a substantial part of most local school-lunch programs and has set up minimum requirements to be met in the lunch operations of participating schools, the lunch projects have been and still are basically community undertakings relying on local initiative, administration, and sponsorship.

During the peak period of participation in 1942, under the National School Lunch Program, 6 million pupils were receiving some kind of food supplement varying from a complete noon meal to a glass of milk. In that year there were probably close to 26 million students, between the ages 6 to 19, attending school who would have been eligible to participate in the school-lunch program if it had been operating in every school of the Nation. Actually, not more than 25 percent of all children attending school in the peak period of the National School Lunch operation, were participating, and of that total a much smaller percentage were receiving a complete noonday lunch. The objectives of a postwar school-lunch program are thus clearly evident: (1) The participation of every school in the program and (2) the provision of a complete lunch to every child attending school.²⁹

²⁸ Before the 1943-44 program, the Federal Government made available to schools participating in the national program certain surplus foods, free of charge; and beginning with that program the Department of Agriculture has indemnified each participating school at a rate of approximately 60 percent of food costs of each meal served.

²⁹ For detailed operation of the School Lunch Program, see Southworth and Klayman (17) and Hearings before a Senate Subcommittee of the Committee on Agriculture and Forestry (20).

The service program—in-plant feeding—developed considerably under the impact of war. The Federal Government asked all large plants and factories to provide lunch facilities where workers could get a complete well-balanced meal at minimum prices without leaving the premises. In this country, contrary to the wartime policy of Great Britain, no subsidies have been made to private enterprises to expand in-plant feeding. The Government has simply asked, and has worked with employers to provide such lunch facilities. It was thought that this service would aid greatly in maintaining plant efficiency by (1) reducing time involved in going to and from lunch places and (2) providing workers with the energy and protective food required by them. This is not a spectacular program but it can make a real contribution to sustained good health providing the lunches served in plants and factories meet established nutritional standards. And if not abused this type of program can make a real contribution to the disposal of commodities that are in seasonal surplus.

The development of frozen-food lockers, both as cooperative and as private enterprises in both rural and rural-urban areas, was having an influence on the diets of rural people before World War II. With the advent of these lockers, farm and rural people were able for the first time to store fresh meat and fresh vegetables raised on their farms, and thus even out their consumption of those foods in a balanced year-round pattern. The storage facilities that had long made possible such a balanced consumption pattern throughout the year, among urban people, were converted into a form capable of providing the same basic services to farm people. In the periods after the war a further development of frozen-food lockers, either as community enterprises or single farm units, will undoubtedly take place. If the average farm is electrified and if economically priced refrigeration units, designed to quick freeze and cool, can be developed, the community-type frozen food lockers may become obsolete, but only because a more complete service has supplanted it. Individual frozen-food and cooling units open up vast possibilities for processing and storing all perishable foods, and hence a means of improving the dietaries of farm people.

Perhaps one of the greatest contributions that can be made toward increasing the consumption of food, especially among low-income people, is a reduction of the costs of handling food between the farmers and the consumers. This is a broad and somewhat unknown area, and its importance has grown, relative to the production area, with the tendency toward specialization of production. Much has been said and written concerning the need for reducing the costs of food distribution, but specific suggestions as to how they are to be reduced are not so readily found, and not many of the suggestions that have been made have fallen on fertile ground. If greater efficiencies are to be realized they will probably come through attacking concrete and often isolated problems and forcing the acceptance of a new or improved practice in each case. On the other hand, if the economy continues to become more and more specialized, it is altogether likely that distributive costs will continue to grow relative to production costs, and in some cases even when there is a decline in total costs.

RECAPITULATION

The broad outline of a food and nutrition program directed to the realization of a high level of food consumption has been sketched in the previous pages. Within that outline, three approaches—the income approach, the educational approach, and the service approach—have been suggested as indispensable parts of the larger program. Further, within each of those approaches several food-consumption mechanisms have been described, certain of which might be considered as alternative, some as complementary, and others as supplementary measures. The endeavor has been to provide a frame of reference for thinking about problems of food consumption, and a wide array of specific measures has been presented for consideration and discussion. But no particular measure or combination of measures for improving the dietaries of the people of the United States have been recommended as the most desirable program. It is hoped, however, that the facts and figures presented together with the discussion of certain food consumption mechanisms will contribute to the formulation of a comprehensive food and nutrition program for the Nation.

TABLE 15.—*Per capita consumption of major food categories by farm families (excluding military personnel and institutional groups), by income level United States, 1941*

Food category	Under \$500	\$500-\$999	\$1,000-\$1,499	\$1,500-\$1,999	\$2,000-\$2,999	\$3,000-\$4,999	\$5,000 and over
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Dairy products:							
Fluid milk	432.7	503.2	536.6	576.0	594.7	585.2	608.7
Cheese	1.8	2.7	4.7	5.5	6.4	6.5	6.8
Cream	8.7	9.8	15.8	15.2	17.3	18.1	24.9
Ice cream	1.1	2.4	3.9	4.6	6.0	7.6	8.2
Evaporated and other	5.1	6.5	9.7	11.5	14.0	8.5	31.7
Potatoes and sweetpotatoes	102.8	135.6	206.9	211.6	234.6	269.5	242.4
Dry beans and peas, and nuts:							
Dried vegetables	13.9	13.3	16.3	14.8	13.9	16.9	15.6
Nuts	1.4	1.8	3.6	4.3	4.9	5.7	10.5
Tomatoes and citrus fruit:							
Fresh tomatoes	13.9	16.1	18.6	17.4	22.8	25.3	23.6
Canned tomatoes and citrus	9.0	13.4	17.9	20.4	22.3	21.5	29.2
Fresh citrus fruit	6.3	9.0	15.0	18.6	22.2	27.1	37.7
Leafy green and yellow vegetables:							
Fresh	94.5	96.7	102.9	111.0	121.4	133.1	81.6
Canned	7.9	10.9	17.8	19.5	22.3	24.6	18.2
Other vegetables and fruit:							
Other fresh vegetables	96.7	92.3	85.1	91.5	115.6	137.9	92.6
Other canned vegetables	9.1	12.9	22.0	23.8	24.8	33.6	25.9
Other fresh fruit	85.1	82.8	84.7	86.7	105.5	154.8	83.6
Canned fruit	11.6	13.5	20.8	25.2	26.2	28.7	32.4
Dried fruit	3.6	3.9	6.0	7.1	7.5	9.7	15.8
Eggs	22.4	27.6	36.1	43.0	46.6	46.6	47.6
Meat, poultry, and fish:							
Beef	13.7	15.8	24.0	30.0	31.8	36.9	49.8
Veal	3.5	3.4	3.7	5.9	5.3	6.6	9.5
Lamb and mutton	1.2	2.1	2.8	4.4	6.8	7.8	24.0
Pork (lean)	17.7	24.2	40.8	43.5	53.4	65.6	54.0
Poultry	18.3	19.1	24.0	23.8	25.4	33.1	33.7
Other meats	4.0	5.8	9.6	11.8	13.6	10.3	6.6
Sea food	12.3	12.3	12.9	12.0	14.3	14.9	12.1
Flour and cereals:							
Bread	16.4	21.1	37.3	47.7	52.2	65.3	59.3
White flour	134.4	131.2	120.7	111.6	105.5	105.0	95.5
Other baked	3.7	4.3	7.1	8.7	9.9	9.9	11.8
Other cereal products	107.0	93.2	71.8	64.2	56.9	64.7	70.0
Butter and other fats:							
Butter	11.7	14.3	15.3	16.3	15.9	18.1	15.6
Bacon and salt side	27.5	26.4	23.0	21.1	18.9	26.1	27.5
Other fats and oils	20.0	21.2	21.8	21.6	23.5	26.9	29.9
Sugar and other sweets:							
Sugar	55.2	60.3	70.2	72.8	79.8	83.2	80.4
Other sweets	9.2	10.4	12.1	12.4	13.1	14.4	14.5

TABLE 16.—*Per capita consumption of major food categories by nonfarm families (excluding military personnel and institutional groups), by income level, United States, 1941*

Food category	Under \$500	\$500– \$999	\$1,000– \$1,499	\$1,500– \$1,999	\$2,000– \$2,999	\$3,000– \$4,999	\$5,000 and over
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Dairy products:							
Fluid milk	116.0	205.8	264.8	265.9	285.0	305.5	354.9
Cheese	5.3	6.1	7.1	8.6	9.7	10.4	11.4
Cream	0.8	1.9	5.1	8.2	12.1	18.8	31.9
Ice cream	2.4	7.2	11.4	15.3	19.1	22.8	34.6
Evaporated and other	14.7	23.7	21.1	19.8	17.2	13.1	10.8
Potatoes and sweetpotatoes	85.9	117.9	117.1	118.6	117.7	113.5	124.2
Dry beans and peas, and nuts:							
Dried vegetables	13.9	12.3	9.9	8.1	6.6	5.2	4.1
Nuts	0.2	2.7	4.0	4.3	4.8	5.5	9.6
Tomatoes and citrus fruit:							
Fresh tomatoes	5.6	12.4	15.3	17.9	20.1	22.6	27.9
Canned tomatoes and citrus	7.8	11.2	14.2	16.3	19.1	22.1	29.1
Fresh citrus fruit	12.2	32.2	48.0	62.5	77.5	96.6	136.0
Leafy green and yellow vegetables:							
Fresh	33.0	46.1	54.7	63.9	71.2	78.9	97.2
Canned	6.0	10.4	12.4	13.7	14.9	16.2	20.2
Other vegetables and fruit:							
Other fresh vegetables	35.4	41.1	49.6	61.6	66.4	79.2	104.2
Other canned vegetables	7.6	17.3	19.9	20.3	20.3	19.1	19.8
Other fresh fruit	41.7	70.3	91.9	111.8	131.3	159.5	247.8
Canned fruit	12.0	16.9	23.7	27.6	33.0	39.1	49.2
Dried fruit	1.8	3.2	4.2	4.3	4.7	4.9	5.7
Eggs	22.1	32.0	35.3	37.6	39.4	40.3	45.8
Meat, poultry, and fish:							
Beef	24.4	42.1	47.9	53.8	57.4	60.8	74.2
Veal	4.1	4.9	6.9	8.1	9.7	11.3	14.0
Lamb and mutton	0.8	2.3	3.8	5.6	8.1	11.5	23.1
Pork (lean)	19.9	29.4	36.9	40.1	44.4	47.3	54.7
Poultry	6.4	10.3	13.8	17.8	23.5	35.6	68.7
Other meats	7.4	14.4	14.8	14.5	13.8	11.4	10.8
Sea food	10.8	10.8	11.4	13.0	13.1	14.8	19.9
Flour and cereals:							
Bread	32.1	76.6	84.5	87.8	87.3	82.9	97.6
White flour	133.8	72.6	52.3	45.8	44.4	41.8	46.7
Other baked	6.0	10.6	15.5	18.2	19.0	19.8	28.6
Other cereal products	121.0	65.4	59.3	57.0	58.7	58.1	65.8
Butter and other fats:							
Butter	7.2	12.1	13.8	15.4	16.6	17.7	20.6
Bacon and salt side	23.1	15.4	15.4	16.2	16.8	17.6	20.2
Other fats and oils	36.2	32.3	29.9	28.6	27.9	27.8	32.6
Sugar and other sweets:							
Sugar	54.2	59.7	61.3	60.3	61.7	62.1	66.9
Other sweets	39.5	30.6	34.5	34.1	35.0	35.2	54.3

TABLE 17.—*Distribution of population by income class (assumed conditions for year 1950)¹*

Income class ²	Farm		Nonfarm		Total
	Single persons	Persons in ³ families	Single persons	Persons in ³ families	
Under \$500	367,000	3,239,000	1,201,000	5,491,000	10,298,000
\$500–\$999	350,000	7,300,000	2,517,000	14,427,000	24,594,000
\$1,000–\$1,499	139,000	6,262,000	2,392,000	18,886,000	27,679,000
\$1,500–\$1,999	30,000	4,528,000	1,538,000	17,346,000	23,442,000
\$2,000–\$2,999	19,000	4,209,000	1,571,000	22,094,000	27,893,000
\$3,000–\$4,999	10,000	3,194,000	886,000	18,986,000	23,076,000
\$5,000 and over		549,000	179,000	3,990,000	4,718,000
Institutionalized persons					2,300,000
Total					144,000,000

¹ Estimated total population for year 1950 taken from National Resources Planning Board (23, table 7, p. 68).² Money plus nonmoney income.³ The individual is classified according to the total income of the family unit, and not according to average per capita income.

TABLE 18.—*Distribution of population by income classes regrouped with boarders included in family units in which they board (assumed conditions for year 1950)*¹

Income class ²	Farm		Nonfarm		Total
	Single	Family members and boarders	Single	Family members and boarders	
Under \$500	55,000	3,269,000	616,000	5,555,000	9,495,000
\$500-\$999	102,000	7,454,000	1,328,000	14,749,000	23,633,000
\$1,000-\$1,499	99,000	6,374,000	1,147,000	19,573,000	27,193,000
\$1,500-\$1,999	18,000	4,636,000	1,059,000	18,064,000	23,777,000
\$2,000-\$2,999	12,000	4,328,000	1,343,000	23,070,000	28,753,000
\$3,000-\$4,999	10,000	3,279,000	833,000	19,886,000	24,008,000
\$5,000 and over		560,000	179,000	4,102,000	4,841,000
Institutionalized persons					2,300,000
Total					144,000,000

¹ Estimated total population for year 1950 taken from National Resources Planning Board (23, table 7, p. 68).

² Money plus nonmoney income.

TABLE 19.—*Estimates of farm production in 1943 compared with production in period 1935-39*¹

Farm product	Unit	1935-39	1943	Percentage
				1943 of 1935-39
Food grains:				Percent
Wheat (all)	Million bushels	759	836	110
Rye harvested for grain	Do.	45	31	69
Rice	Do.	50	70	140
Feed grains:				
Corn (all)	Do.	2,316	3,076	133
Oats	Do.	1,045	1,144	109
Barley	Do.	239	322	135
Sorghums harvested for grain	Do.	56	103	184
All tame hay	1,000 ton	74,244	87,264	118
Sugar and sugar crops:				
Sugarcane for sugar	Do.	5,682	6,449	113
Sugar beets	Do.	9,623	6,522	68
Syrups (sorgo and cane)	1,000 gallons	36,835	31,000	84
Beans and peas: ²				
Dry edible beans and peas (uncleaned)	1,000 hundredweight	17,120	31,993	187
Vegetables:				
Processing vegetables (11 crops)	1,000 ton	3,505	4,981	142
Commercial vegetables (25 crops)	Do.	6,385	6,508	102
Potatoes	1,000 bushels	355,513	464,656	131
Sweetpotatoes	Do.	67,927	72,572	107
Fruits:				
All citrus, fresh basis	Million pound	8,316	13,935	168
All other fruit, fresh basis	Do.	18,000	15,448	86
Oil crops:				
Soybeans harvested for beans	1,000 bushels	56,167	195,762	349
Flaxseed	Do.	10,991	52,008	473
Peanuts, picked and threshed	Million pound	1,229	2,200	179
Cotton (all—500-pound bales)	1,000 bales	13,149	11,427	87
Tobacco	Million pound	1,460	1,400	96
Livestock ³ (live weight slaughter):				
Hogs	Do.	12,834	25,543	199
Cattle and calves	Do.	15,027	18,419	123
Sheep and lambs	Do.	1,876	2,136	114
Chickens and broilers	Do.	2,421	4,014	166
Turkeys	Do.	385	513	133
Milk	103,624	117,689	114	
Eggs ³	Million dozen	3,032	4,514	149

¹ Based on data compiled in the Bureau of Agricultural Economics.

² Data for livestock are unpublished estimates of live weight of total slaughter.

³ Does not include nonfarm egg production which is estimated at about 10 percent of farm production.

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